SUL6001 Low Noise High PSRR 1 Ch 500mA/ 1A Ultra Low Dropout LDO

FUNCTIONAL DESCRIPTION

The SUL6001 series is a CMOS-based positive low-dropout linear regulator (LDO) featuring 500mA/ 1.0A that provides high PSRR, high output voltage accuracy, low-noise and low supply current.

It consists of a voltage reference, an error amplifier, a resistor-ladder for output voltage setting. It also has under-voltage lockout (UVLO), over current/short circuit protection circuit and over temperature shutdown circuit.

The SUL6001 typically has 85mV dropout voltage (DFN1216-8, Iout=1A, Vout=3.3V) and 140mV dropout voltage (DFN1216-8, Iout=1A, Vout=1.8V) and chip enable function (EN) for long battery life.

Excellent ripple rejection, load transient and line transient response make it ideal for the power sources of mobile communication devices or camera modules in low light condition. It can also turn on under full load condition, making it suitable for harsh system environment.

The SUL6001 series LDOs have option for output current limit between 1A or 500mA by alternating the LCON pin between "H" or "L" for DFN1216-8 package version.

The SUL6001 is available in SOT23-5, DFN2x2-6, DFN3x3-8, DFN1216-8 package, and standard products are Pb-free and Halogen-free.

MAIN FEATURES

- Supply Current (no load): 85µA (typ.)
- Supply Current (Standby): 0.1µA (typ.)
- Low Dropout Voltage: 85mV @1A, 50mV @500mA, when Vout=3.3V
- High-PSRR: 85dB @1kHz
- Ultra Low Output Noise: 10µVrms (10-100KHz, 0.85V output voltage settings, typ.)
- Line Regulation: 0.01%/V
- Fixed Mode Voltage Range: 0.85V to 4.3V with 0.05V step.
- Adjustable Mode Voltage Range: 0.85V to 4.6V
- Built-in Short Current Protection Limit: 120mA (LCON='H', 1.0A, typ.)
- Bulit-in Peak Current Protection Limit: 1.7A (LCON='H', 1.0A, typ.)
- Over Temperature Protection and Auto Recover
- Built-in Soft-Start and Inrush Current Limit
- Fast Auto Discharge Function for Power Down

APPLICATIONS

- Portable Device , Tablets and Smartphone
- Cameras, VCRs and Car Dash Cameras
- Low Light & Low Noise Cam Application
- Communications and Infrastructure
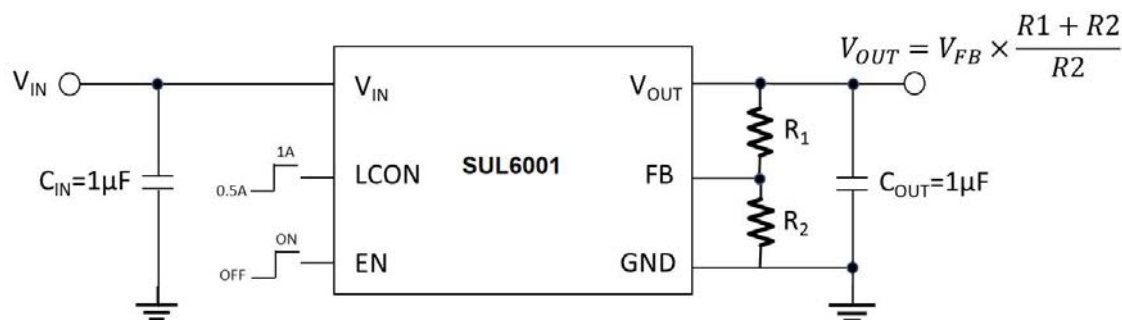- AR or VR Application
- DDR Application

TYPICAL APPLICATION CIRCUIT

Typcal application circuit for fixed version
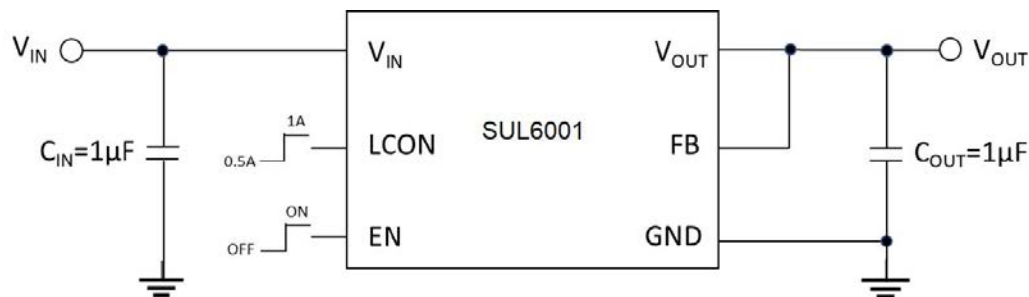
Note: Recommended Ceramic Capacitors for Vin and Vout: 1uF

Typcal application circuit for Adjustable (ADJ) version

$$V_{OUT} = V_{FB} \times \frac{R1 + R2}{R2}$$

The adjustable-version device requires external feedback divider resistors to set the output voltage. V_{OUT} is set using the feedback divider resistors, R_1 and R_2 , according to the following equation:

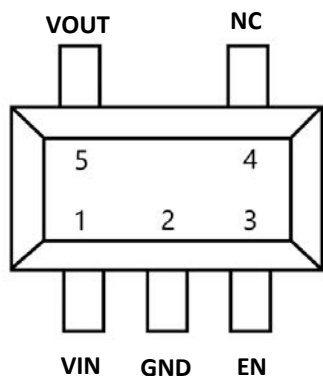$$V_{OUT} = V_{FB} \times (1 + R_1 / R_2)$$

For this device, V_{FB} = 0.85 V.

To ignore the FB pin current error term in the V_{OUT} equation, set the feedback divider current to 100x the FB pin current listed in the Electrical Characteristics table. This setting provides the maximum feedback divider series resistance, as shown in the following equation:
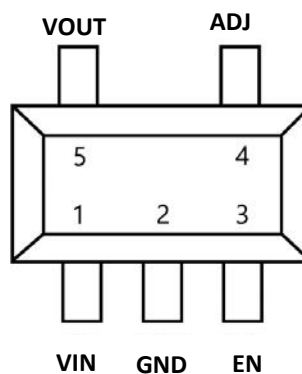
$$R_1 + R_2 \leq V_{OUT} / (I_{FB} \times 100)$$

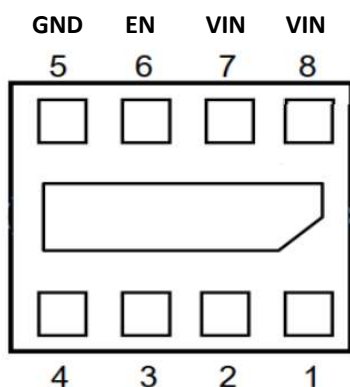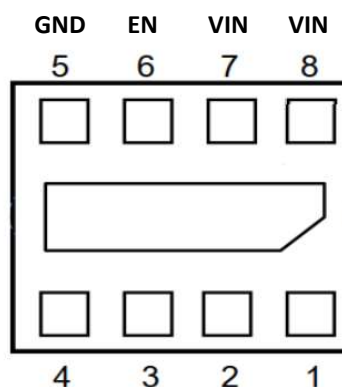For this device, I_{FB} = 10nA.

PIN ASSIGNMENT & DESCRIPTION

VOUT   NC

```
   5        4
   1    2   3
```

VIN   GND   EN

SOT23-5 (Fixed Mode)

VOUT   ADJ

```
   5        4
   1    2   3
```

VIN   GND   EN

SOT23-5 (Adjustable Mode)

PIN No	Symbol	Pin Description
1	VIN	Input of supply voltage pin
2	GND	Ground pin
3	EN	Enable pin
4	NC/ADJ	No connection / Adjustable output pin
5	VOUT	LDO output voltage pin

GND   EN   VIN   VIN

```
  5    6    7    8


  4    3    2    1
```

NC   LCON   VOUT   VOUT

DFN1216-8 (Fixed Mode)

GND   EN   VIN   VIN

```
  5    6    7    8


  4    3    2    1
```

ADJ   LCON   VOUT   VOUT

DFN1216-8 (Adjustable Mode)

PIN No	Symbol	Pin Description
1	VOUT	LDO output voltage pin
2	VOUT	LDO output voltage pin
3	LCON	Output current limit alternate pin
4	NC/ADJ	No connection / Adjustable output pin
5	GND	Ground pin
6	EN	Enable pin
7	VIN	Input of supply voltage
8	VIN	Input of supply voltage

VIN   NC   EN

| 6 | 5 | 4 |

| 1 | 2 | 3 |

VOUT   NC   GND

DFN2x2-6 (Fixed Mode)

VIN   NC   EN

| 6 | 5 | 4 |

| 1 | 2 | 3 |

VOUT   ADJ   GND
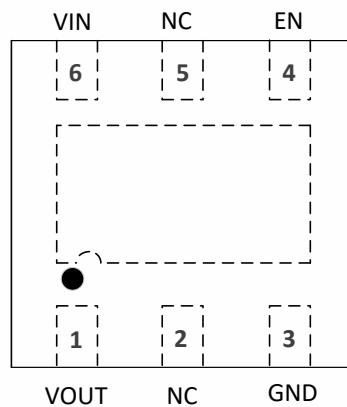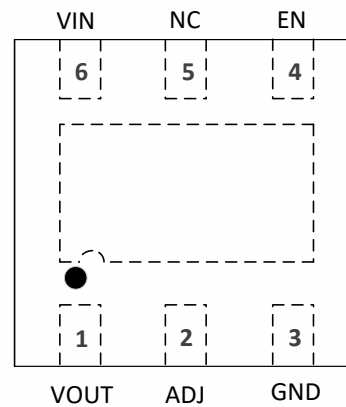
DFN2x2-6 (Adjustable Mode)

PIN No	Symbol	Pin Description
1	VOUT	LDO output voltage pin
2	NC/ADJ	No connection / Adjustable output pin
3	GND	Ground pin
4	EN	Enable pin
5	NC	No connection
6	VIN	Input of supply voltage

VIN   VIN   NC   EN

| 8 | 7 | 6 | 5 |

| 1 | 2 | 3 | 4 |

VOUT   VOUT   NC   GND

DFN3x3-8 (Fixed Mode)

VIN   VIN   NC   EN

| 8 | 7 | 6 | 5 |

| 1 | 2 | 3 | 4 |

VOUT   VOUT   ADJ   GND
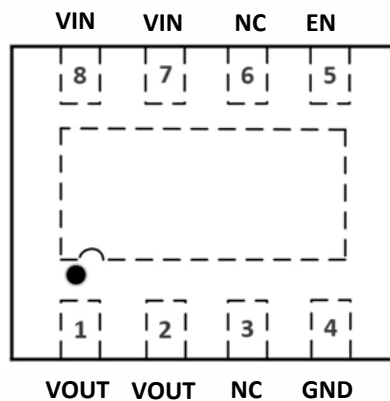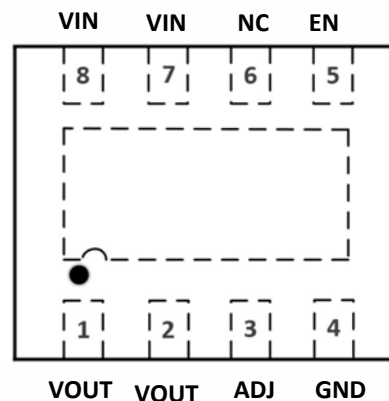
DFN3x3-8 (Adjustable Mode)

PIN No	Symbol	Pin Description
1	VOUT	LDO output voltage pin
2	VOUT	LDO output voltage pin
3	NC/ADJ	No connection / Adjustable output pin
4	GND	Ground pin
5	EN	Enable pin
6	NC	No connection
7	VIN	Input of supply voltage
8	VIN	Input of supply voltage

*Note: Connect exposed pad (heat sink on the back) to GND.

ORDER INFORMATION

Part Number	Package	Tape/Reel	Output Type
SUL6001S5-XX	SOT23-5	3000	Fixed / ADJ
SUL6001D6-XX	DFN2x2-6	3000	Fixed / ADJ
SUL6001-DRB	DFN3x3-8	5000	ADJ
SUL6001D8-XX	DFN1216-8	3000	Fixed / ADJ

For example, 28 means product outputs 2.8V, ADJ/DRB means adjustable output.
SUL6001 devices are Pb-free and RoHS compliant.

ABSOLUTE MAXIMUM RATINGS

Symbol	Item	Rating		Unit
V_{IN}	Input Voltage	6.0		V
V_{CE}	Input Voltage (CE Pin)	-0.3 to 6.0		V
V_{LCON}	Input Voltage (LCON Pin)	-0.3 to 6.0		V
V_{OUT}	Output Voltage	-0.3 to 6.0		V
P_D	Power Dissipation (Standard Land Pattern)	SOT23-5		mW
		DFN2x2-6		
		DFN3X3-8		
		DFN1216-8	1400	
T_{OP}	Junction Temperature Range	−40 to 125		˚C
T_{STG}	Storage Temperature Range	−55 to 125		˚C

ESD RATINGS

Symbol	Parameter	Value	Unit
ESD	Human Body Mode	± 4	kV
	Machine Mode	± 250	V
	Charge Device Mode	± 1000	V

THERMAL DATA

Symbol	Parameter	Package	Value	Unit
θ_{JA}	Thermal resistance junction-ambient	SOT23-5	260	˚C/W
		DFN2x2-6		
		DFN3X3-8		
		DFN1216-8	80	

RECOMMENDED OPERATING CONDITIONS

Symbol	Item	Rating	Unit
V_{IN}	Input Voltage	1.32 to 5.5	V
V_{OUT}	Output Voltage	0.85 to 4.3	V
Ta	Operating Temperature Range	-40 to 85	℃
C_{IN}/C_{OUT}	Input/Output Capacitance	1/1	uF

ELECTRICAL CHARACTERISTICS

$V_{IN} = V_{OUT} + 1.0$ V, $I_{OUT} = 1$ mA, $C_{IN} = C_{OUT} = 1.0$ μF, typical values are at $T_J = 25$ °C; unless otherwise noted.

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
V_{IN}	Operating input voltage			1.32		5.50	V
V_{OUT}	V_{OUT} accuracy	$V_{OUT} + 0.5V \leq V_{IN} \leq 5.5V$	$V_{OUT} \geq 1.75V$	-1.0		+1.0	%
			$V_{OUT} < 1.75V$	-20		+20	mV
V_{FB}	V_{FB} accuracy	$V_{IN} = 2.0V$, $I_{LOAD} = 1mA$		0.8415	0.85	0.8585	V
ΔV_{OUT}	Static line regulation				0.01		%/V
ΔV_{OUT}	Static load regulation	$I_{OUT} = 10mA$ to $500mA$			1	20	mV
		$I_{OUT} = 10mA$ to $1000mA$				40	
V_{DROP}	Dropout voltage	$I_{OUT} = 1A$	$V_{OUT}=1.2V$		245	340	mV
			$V_{OUT}=1.8V$		140	235	
			$V_{OUT}=2.5V$		105	175	
			$V_{OUT}=3.3V$		85	150	
			$V_{OUT}=4.3V$		60	130	
		$I_{OUT} = 500mA$ For SOT-23-5	$V_{OUT}=1.2V$		150	210	
			$V_{OUT}=1.8V$		80	135	
			$V_{OUT}=2.5V$		60	100	
			$V_{OUT}=3.3V$		50	105	
			$V_{OUT}=4.3V$		40	85	
I_Q	Quiescent current	$IOUT = 0mA$			85	140	μA
$I_{Standby}$	Standby current	VIN input current in OFF MODE: VEN = GND			0.1	3	μA
I_{LIM}	Output current limit	$I_{OUT} = 500mA$		0.6	0.78		A
		$I_{OUT} = 1A$			1.7		
I_{SC}	Short-circuit current	$V_{OUT} = 0$ V	$I_{OUT} = 500mA$			186	mA
			$I_{OUT} = 1A$			150	
I_{FB}	Feedback pin current				0.01	0.1	μA
e_N	Output noise voltage				10		μVrms
PSRR	Power Supply Rejection Ratio				85		dB
T_{TSD}	Thermal shutdown	Shutdown, temperature increasing			165		°C
		Reset, temperature decreasing			135		
CE	Enable input logic low	$V_{IN} = 1.32$ V to 5.5 V				0.4	V
	Enable input logic high	$V_{IN} = 1.32$ V to 5.5 V		1			
LCON	LCON input logic low	$V_{IN} = 1.32$ V to 5.5 V				0.4	V
	LCON input logic high	$V_{IN} = 1.32$ V to 5.5 V		1			

LOAD REGULATION (DYNAMIC)
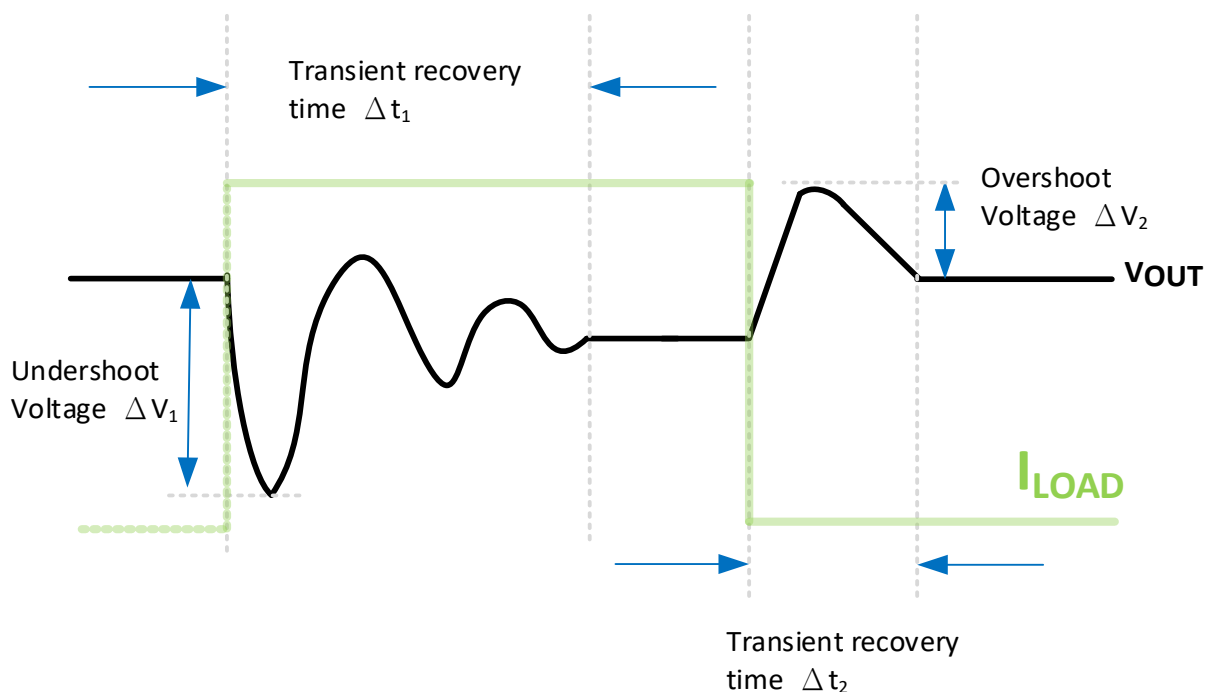
Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
ΔV_1	Undershoot Voltage	I_{LOAD}=1mA~250mA		30		mV
		I_{LOAD}=1mA~500mA		40		
		I_{LOAD}=1mA~1A		62		
		I_{LOAD}=0mA~300mA		50		
		I_{LOAD}=0mA~1A		90		
ΔV_2	Overshoot Voltage	I_{LOAD}=1mA~250mA		28		mV
		I_{LOAD}=1mA~500mA		40		
		I_{LOAD}=1mA~1A		60		
		I_{LOAD}=0mA~300mA		35		
		I_{LOAD}=0mA~1A		65		
Δt_1	Transient recovery time	I_{LOAD}=1mA~250mA		10		µS
		I_{LOAD}=1mA~500mA		16		
		I_{LOAD}=1mA~1A		18		
		I_{LOAD}=0mA~300mA		60		
		I_{LOAD}=0mA~1A		80		
Δt_2	Transient recovery time	I_{LOAD}=1mA~250mA		12		µS
		I_{LOAD}=1mA~500mA		12		
		I_{LOAD}=1mA~1A		16		
		I_{LOAD}=0mA~300mA		90		
		I_{LOAD}=0mA~1A		300		

*This table is SUL6001D8-33 measurement data. For detail load regulation information about other SUL6001 series LDOs, please contact SUNTEK.

TYPICAL CHARACTERISTICS

$V_{IN} = V_{SET}^{(1)} + 1.0$ V, $I_{OUT} = 1$ mA, $C_{IN} = C_{OUT} = 1.0$ µF, LCON="H", typical values are at $T_J = 25$ °C; unless otherwise noted.

Output Voltage vs. Input Voltage ($C_{IN} = C_{OUT} = 1.0$µF, Ta= 25 °C)
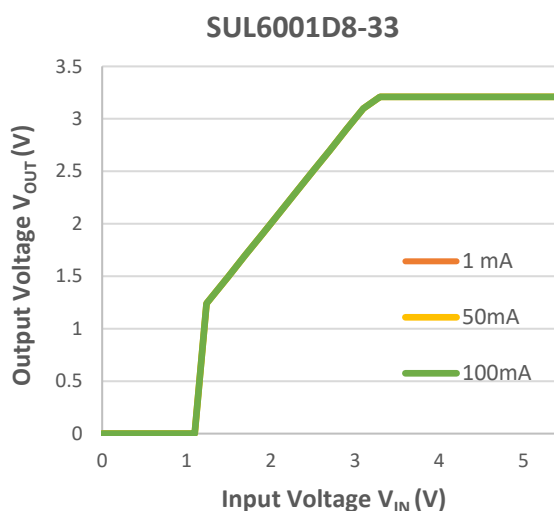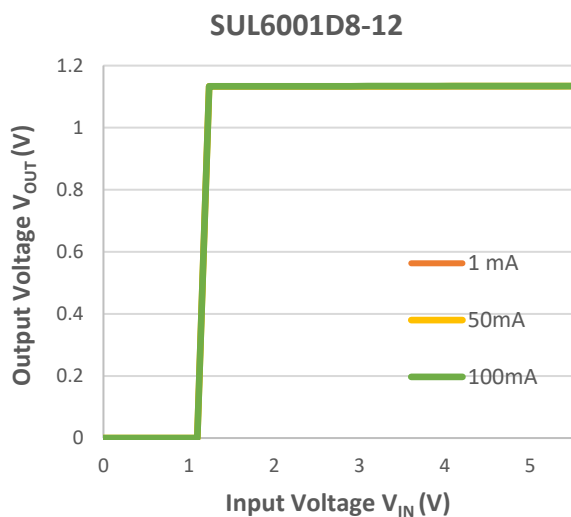
Supply Current vs. Input Voltage ($C_{IN} = C_{OUT} = 1.0$µF, Ta= 25 °C)
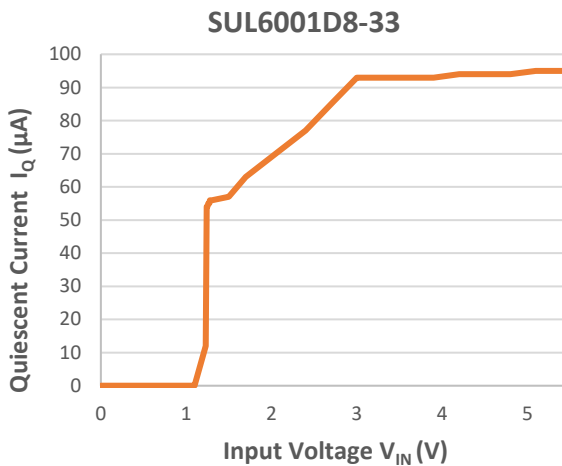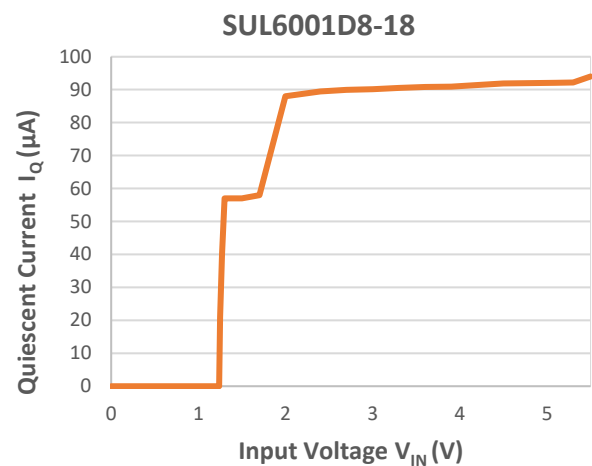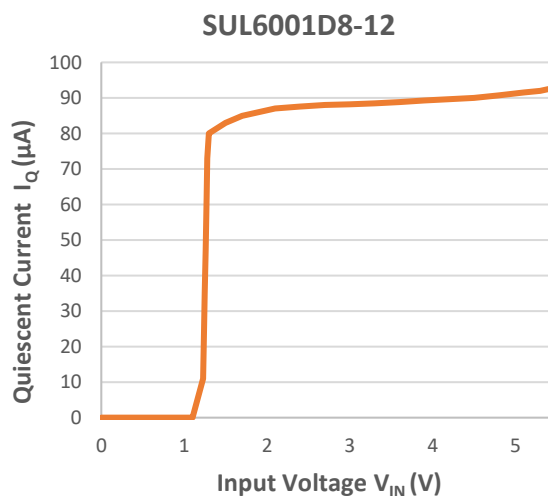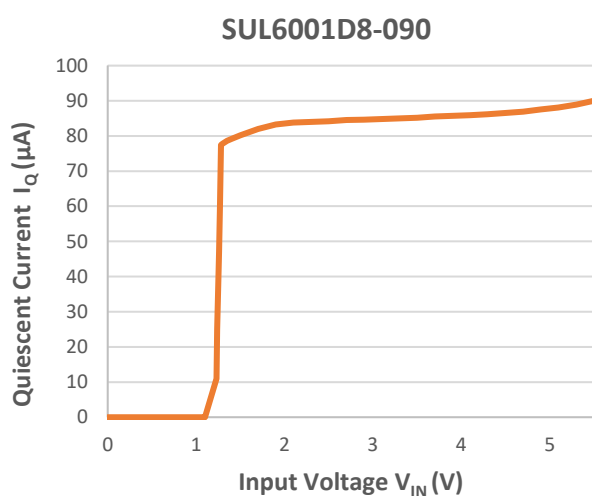
Supply Current vs. Temperature (C$_{IN}$ = C$_{OUT}$ = 1.0µF, I$_{OUT}$= 0 mA)
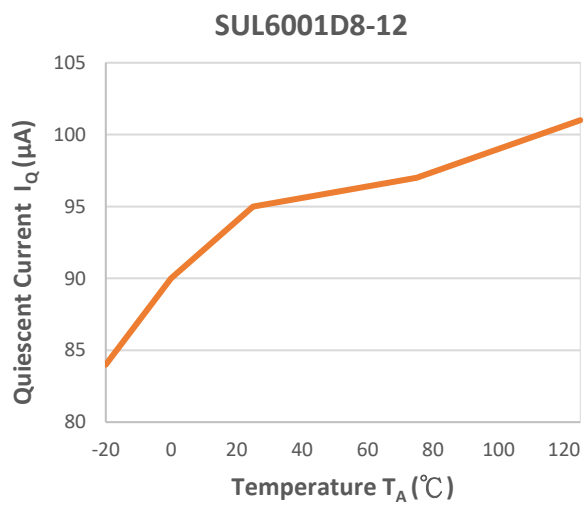
SUL6001D8-12

Over Current Protect Foldback Characteristic (LCON = V_{IN}, C_{IN} = C_{OUT} = 1.0µF, Ta = 25°C)

SUL6001D8-090

Over Current Protection (Foldback)

1.75, 0.868
0.185, 0.118

Output Voltage - Vout
Output Current- Iout

SUL6001D8-12

Over Current Protection (Foldback)

1.73, 0.95
0.18, 0.12

Output Voltage - Vout
Output Current- Iout

SUL6001D8-18

Over Current Protection (Foldback)

2.26, 1.71
0.165, 0.136

Output Voltage - Vout
Output Current- Iout

SUL6001D8-25

Over Current Protection (Foldback)

2.23, 2.34
0.146, 0.174

Output Voltage - Vout
Output Current- Iout

SUL6001D8-33

Over Current Protection (Foldback)

2.34, 3.13
0.164, 0.2

Output Voltage - Vout
Output Current- Iout

SUL6001D8-43

Over Current Protection (Foldback)

2.28, 4.2
0.142, 0.232

Output Voltage - Vout
Output Current- Iout

Output Noise Voltage (10 Hz to 100 kHz, $C_{IN} = C_{OUT} = 1.0\ \mu F$, Ta = 25°C)

SUL6001D8-090, I_{OUT} = 100 mA

Amplitude Spectral Density

V_{RMS} from 10 Hz to 100 kHz

15.10 uVrms
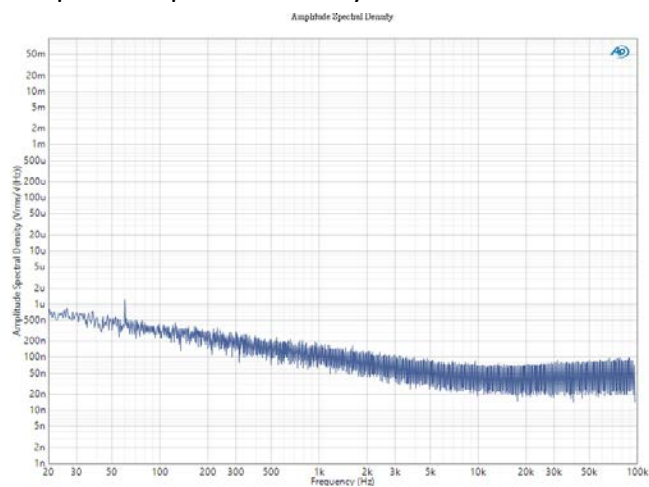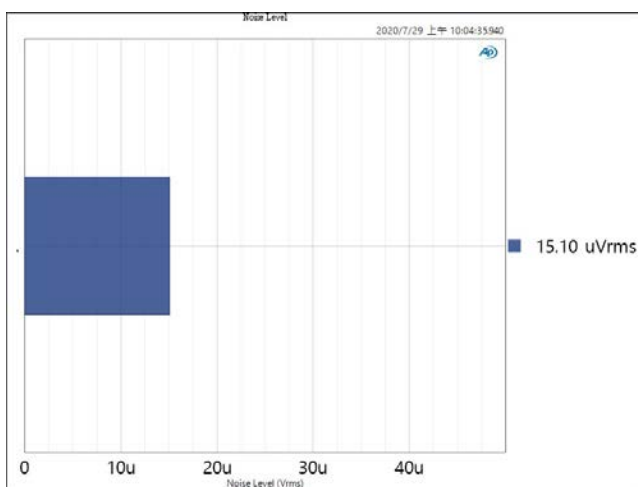
SUL6001D8-12, I_{OUT} = 100 mA

Amplitude Spectral Density

V_{RMS} from 10 Hz to 100 kHz

15.86 uVrms
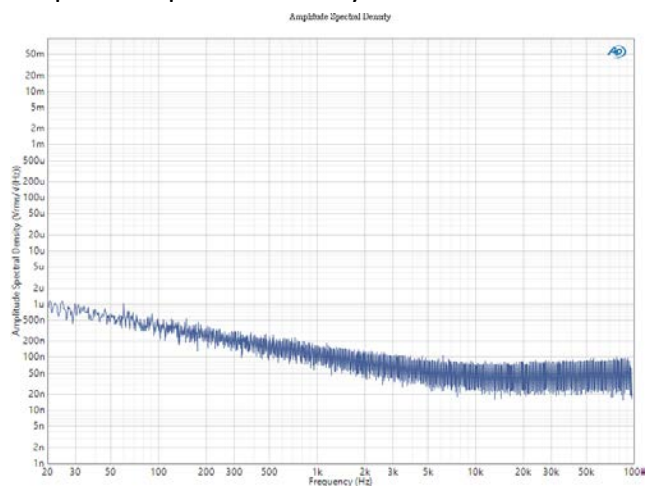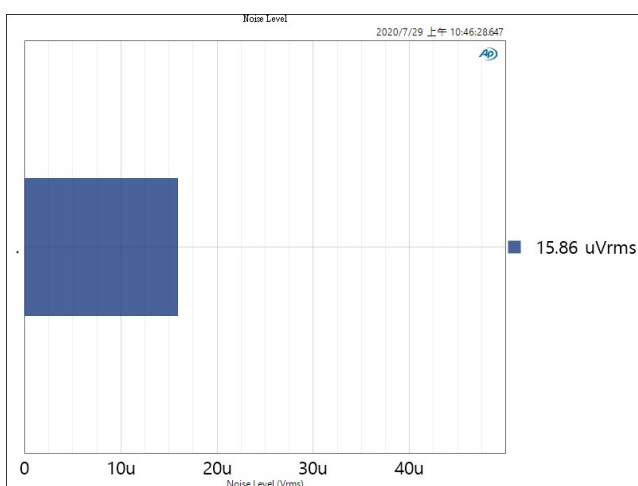
SUL6001D8-33, I_{OUT} = 100 mA

Amplitude Spectral Density

V_{RMS} from 10 Hz to 100 kHz

17.00 uVrms

SUNTEK MICRO LTD
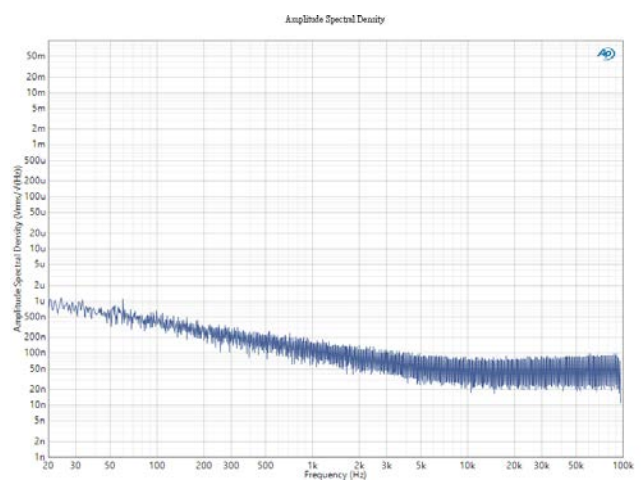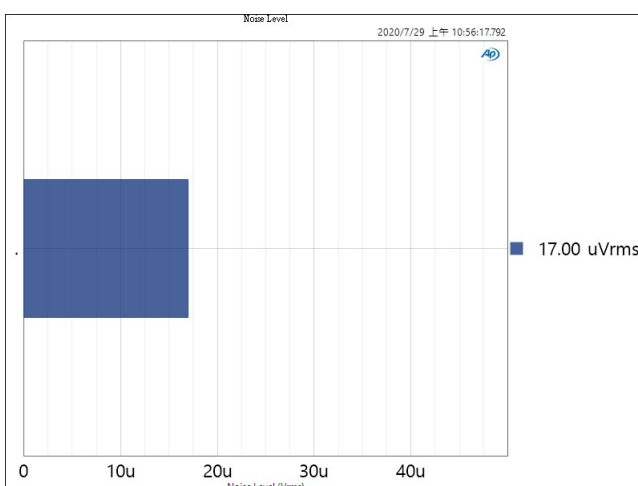
Power Supply Ripple Rejection vs. Frequency ($V_{IN}=V_{OUT}+1V$, $C_{IN} = C_{OUT} = 1.0\mu F$, Ripple = 0.2 Vp-p, Ta = 25°C)

SUL6001D8-090

I_{Load}=1mA
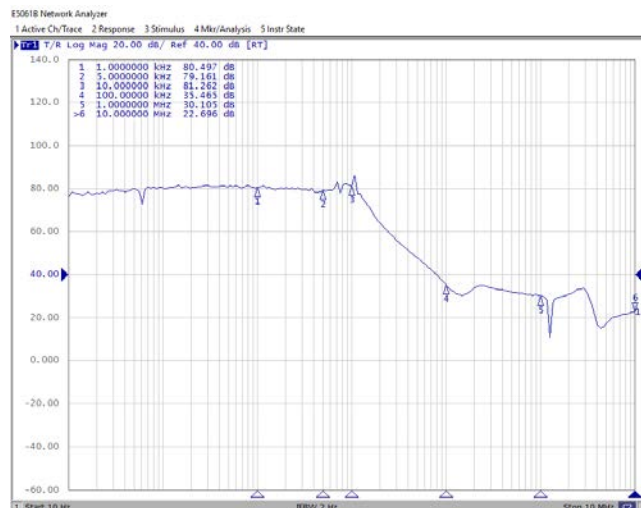
I_{Load}=10mA
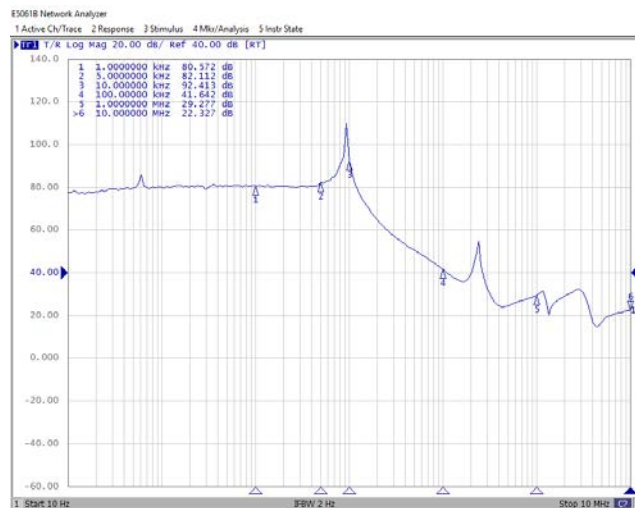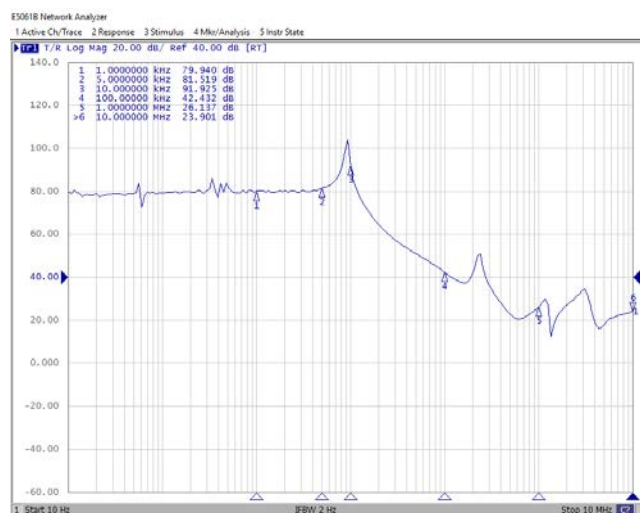
I_{Load}=30mA
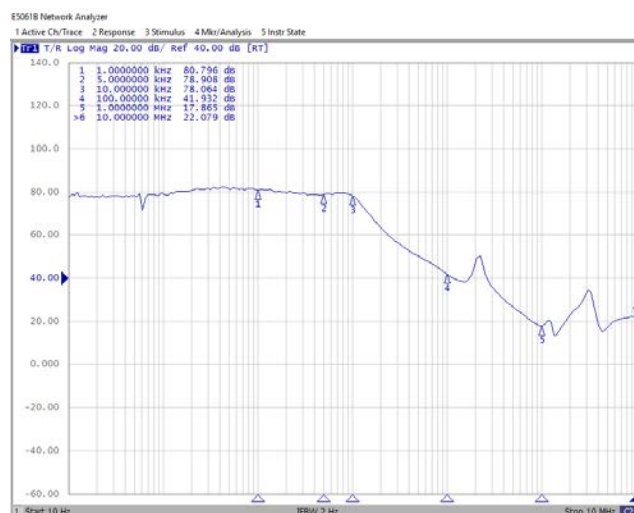
I_{Load}=150mA

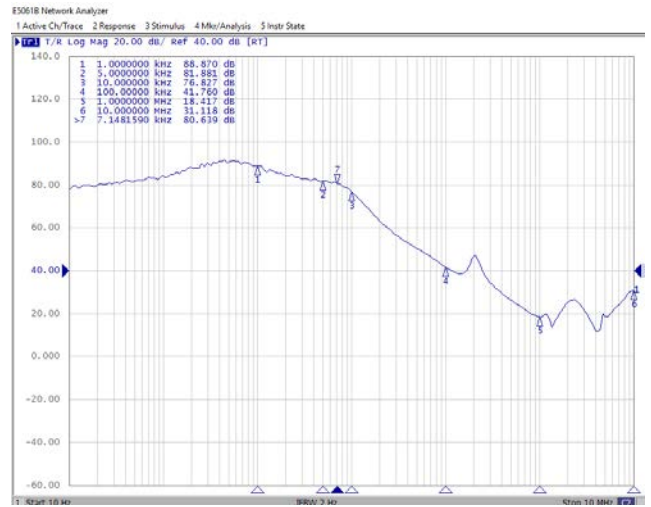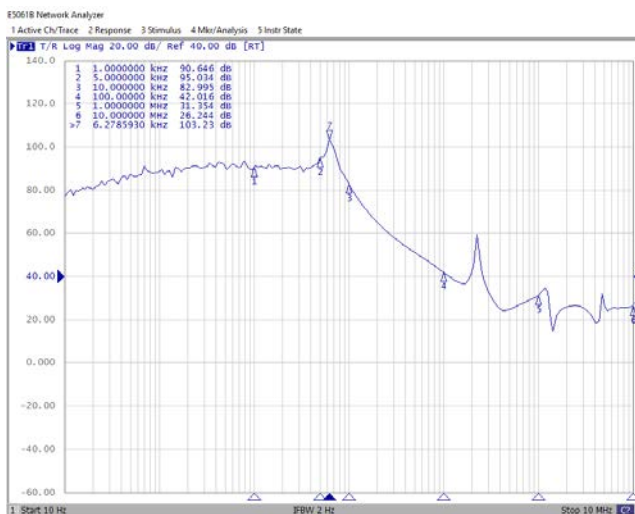## SUL6001D8-12

I_{Load}=1mA
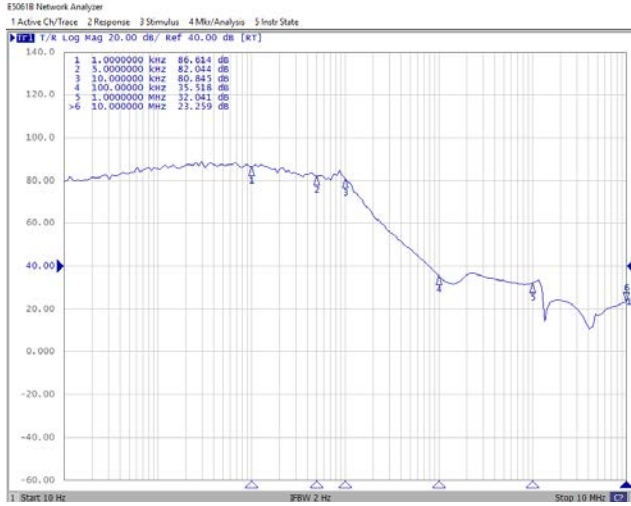
I_{Load}=10mA
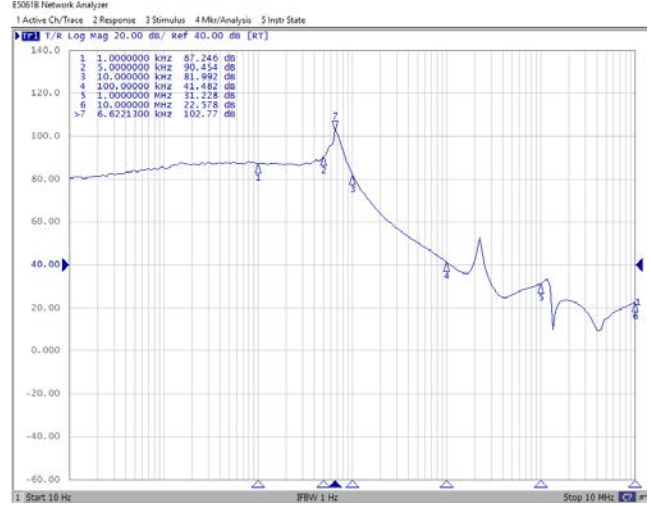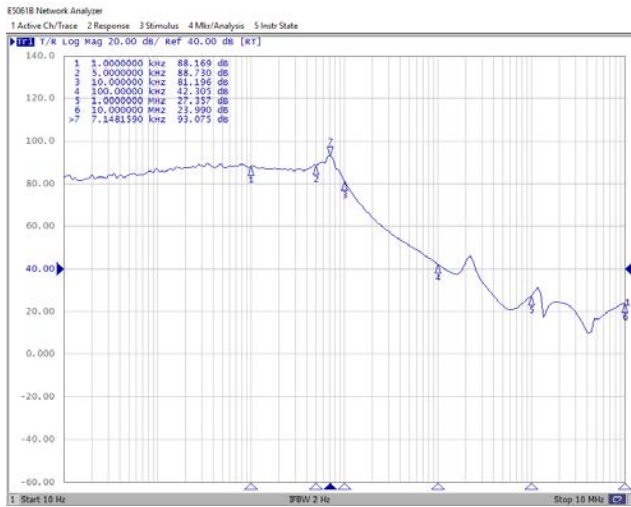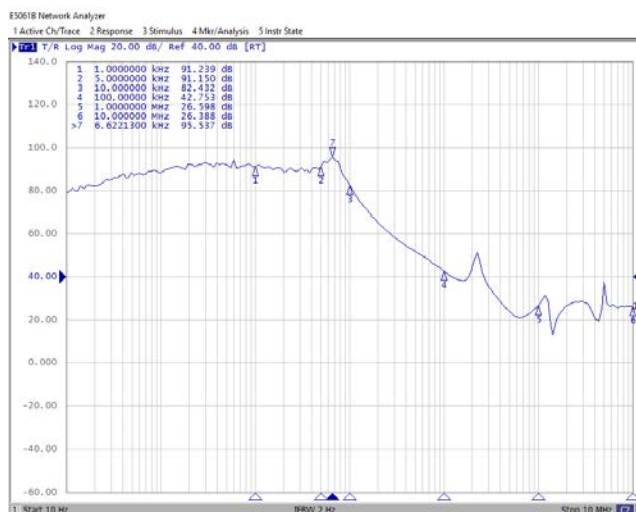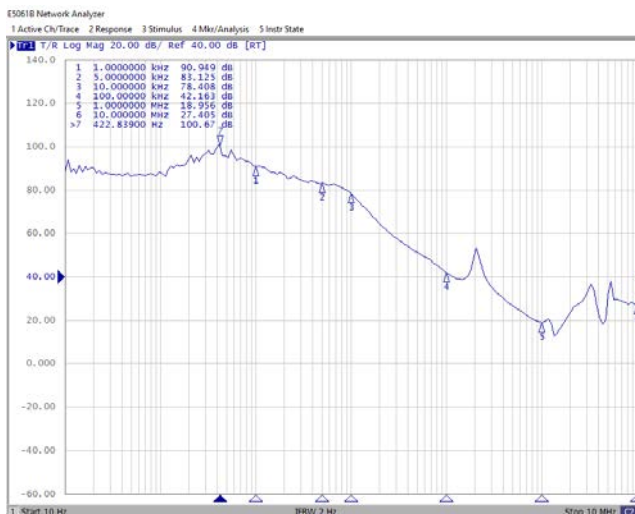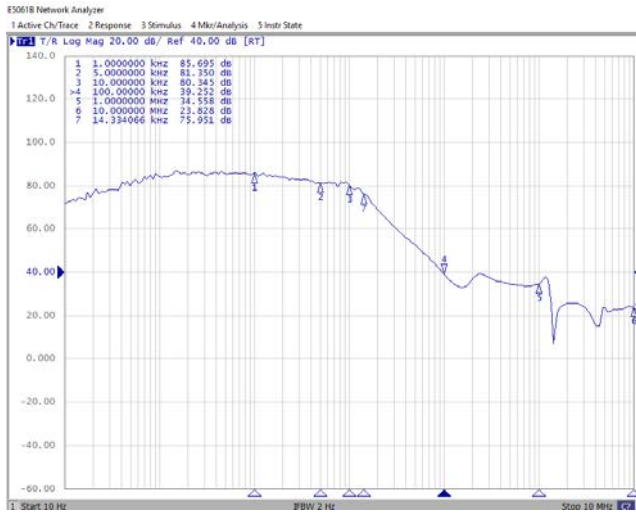

I_{Load}=30mA

I_{Load}=150mA

SUL6001D8-18

I_{Load}=1mA

I_{Load}=10mA
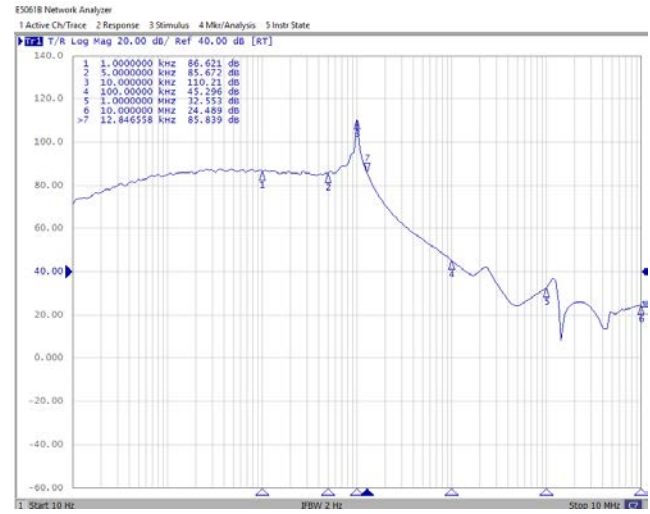

I_{Load}=30mA

I_{Load}=150mA

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SUL6001D8-25

I_{Load}=1mA

I_{Load}=10mA

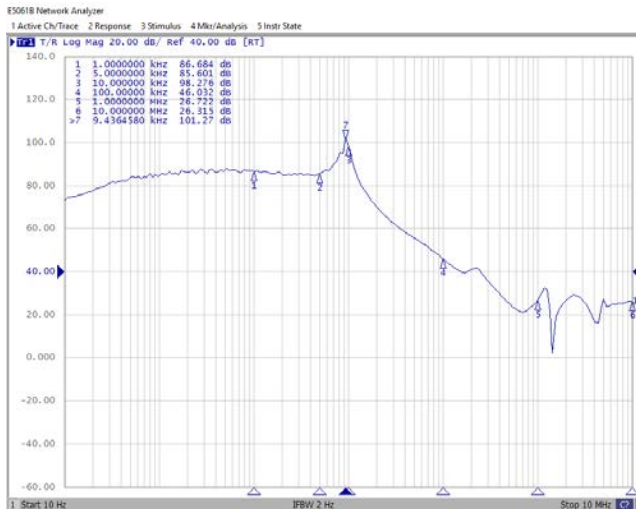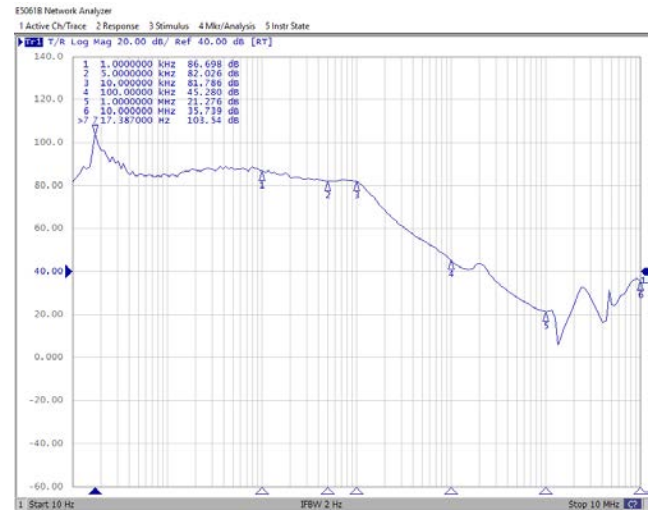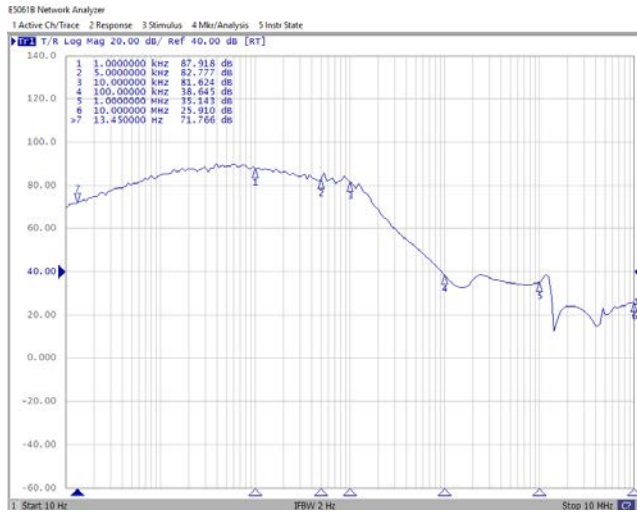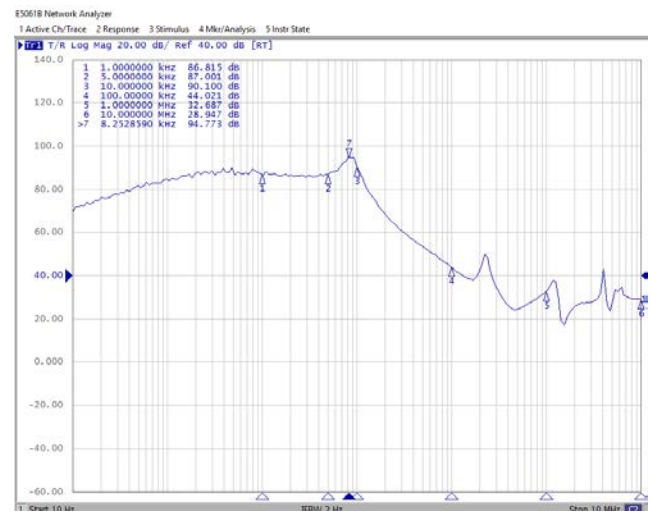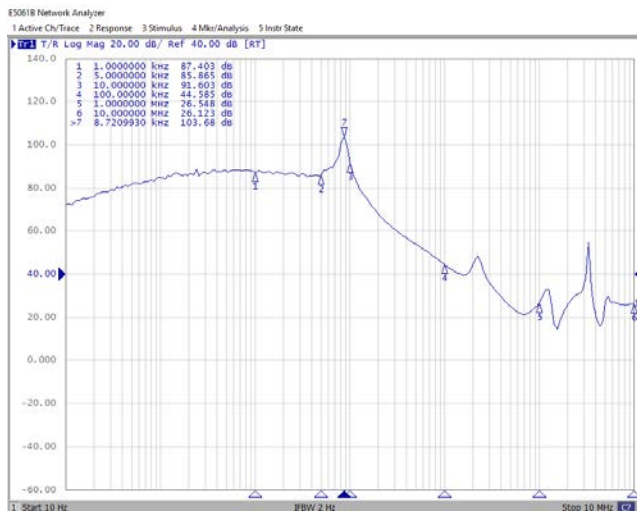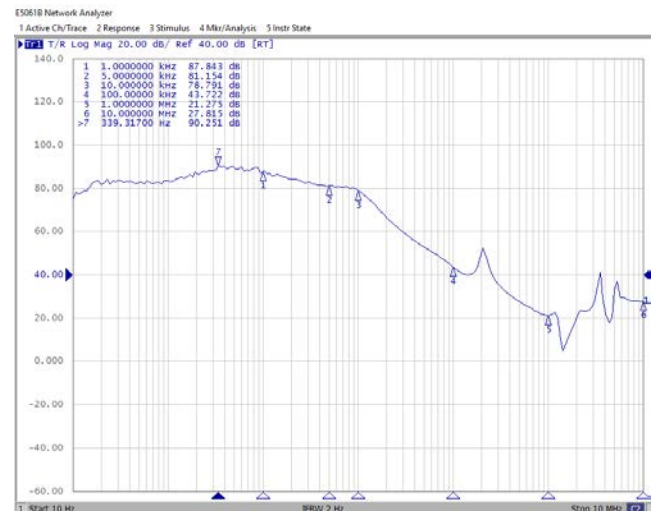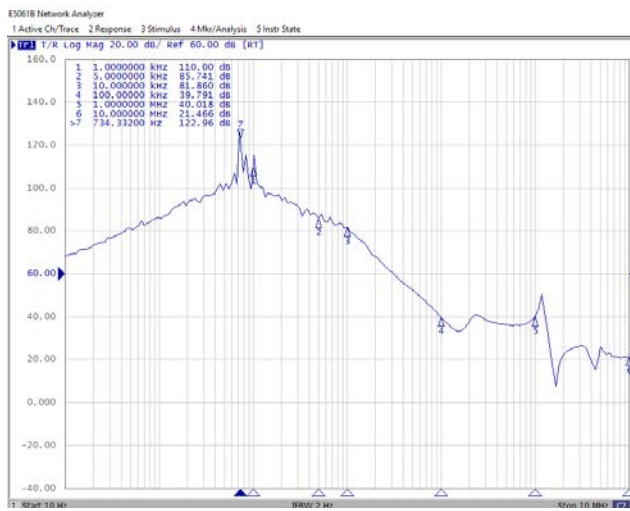
I_{Load}=30mA

I_{Load}=150mA

SUL6001D8-33

I_Load=1mA

I_Load=10mA

I_Load=30mA

I_Load=150mA

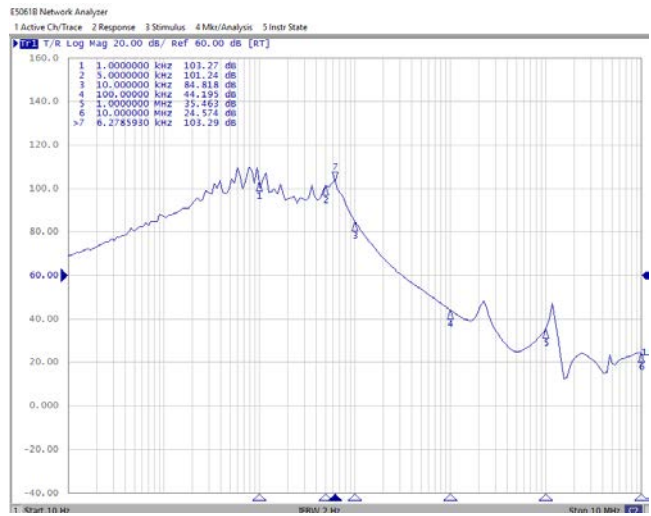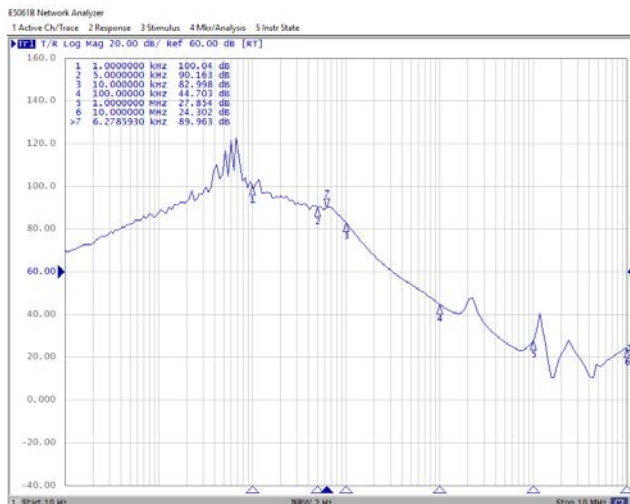## SUL6001D8-43
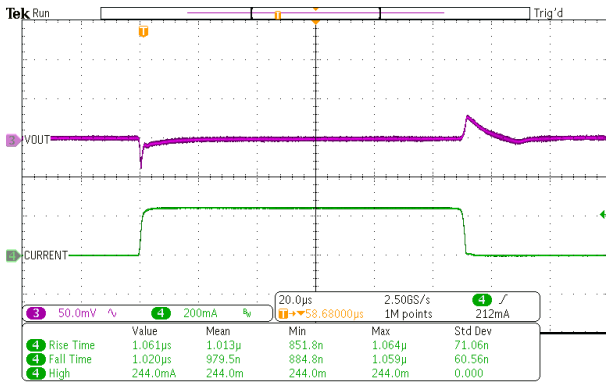
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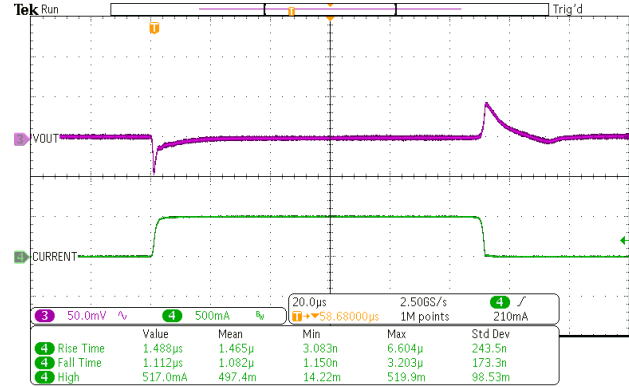
I_Load=10mA

I_Load=30mA

I_Load=150mA

Load Transient Response

($V_{IN}=V_{OUT}+1V$, $C_{IN} = C_{OUT} = 1.0\mu F$, tr = tf = 1µs, T_a = 25°C)

SUL6001D8-090

1mA -> 250mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.061µs	1.013µ	851.8n	1.064µ	71.06n
Fall Time	1.020µs	979.5n	884.8n	1.059µ	60.56n
High	244.0mA	244.0m	244.0m	244.0m	0.000

1mA -> 500mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.488µs	1.465µ	3.083n	6.604µ	243.5n
Fall Time	1.112µs	1.082µ	1.150n	3.203µ	173.3n
High	517.0mA	497.4m	14.22m	519.9m	98.53m

1mA -> 1000mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.342µs	1.314µ	3.456n	2.538µ	177.0n
Fall Time	1.022µs	1.005µ	1.501n	1.468µ	131.1n
High	996.2mA	974.2m	15.31m	997.1m	138.1m

0mA -> 300mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.055µs	Low signal amplitude			
Fall Time	1.017µs	Low signal amplitude			
High	299.8mA	279.2m	17.11m	354.3m	76.86m

0mA -> 1000mA

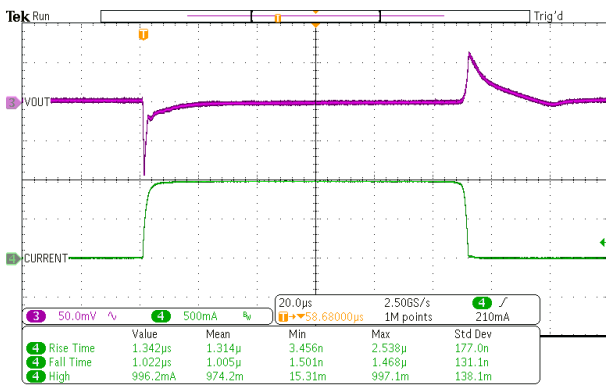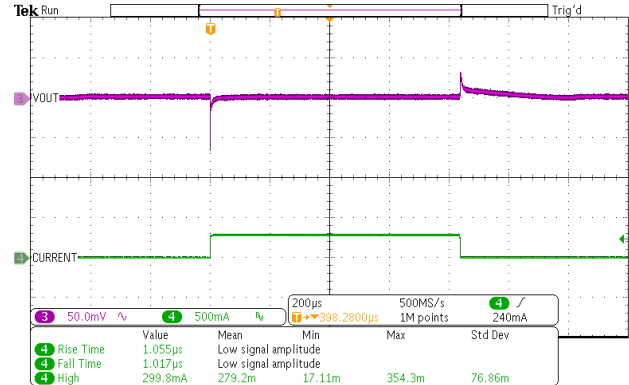|	Value	Mean	Min	Max	Std Dev
Rise Time	1.781µs	1.782µ	1.774µ	1.789µ	5.292n
Fall Time	997.8ns	1.001µ	995.5n	1.006µ	3.599n
High	1.015 A	1.014	1.014	1.019	1.539m

SUL6001D8-12

1mA -> 250mA

1mA -> 500mA

1mA -> 1000mA

0mA -> 300mA

0mA -> 1000mA

SUNTEK MICRO LTD

SUL6001D8-18

1mA -> 250mA

1mA -> 500mA

1mA -> 1000mA

0mA -> 300mA

0mA -> 1000mA

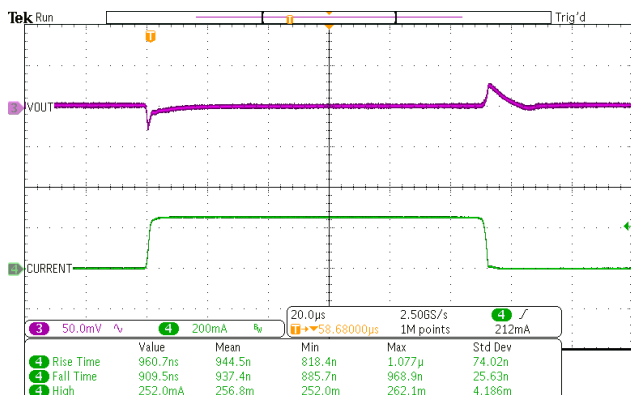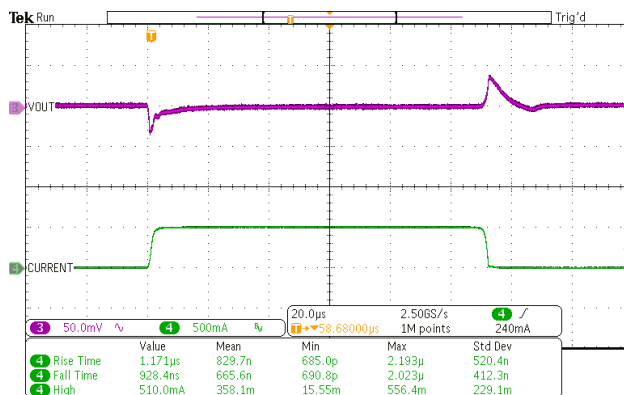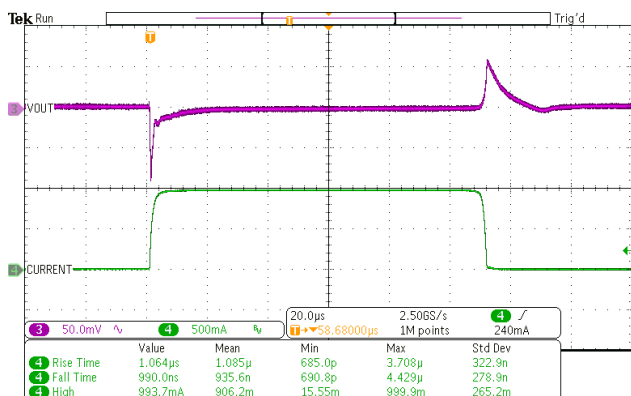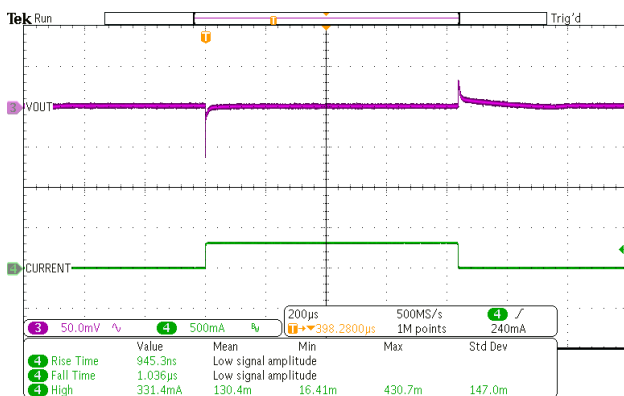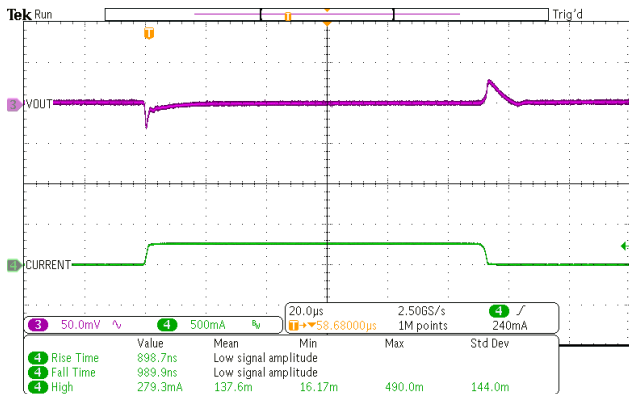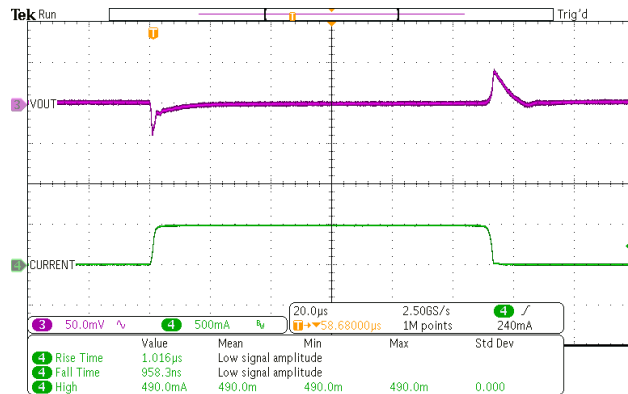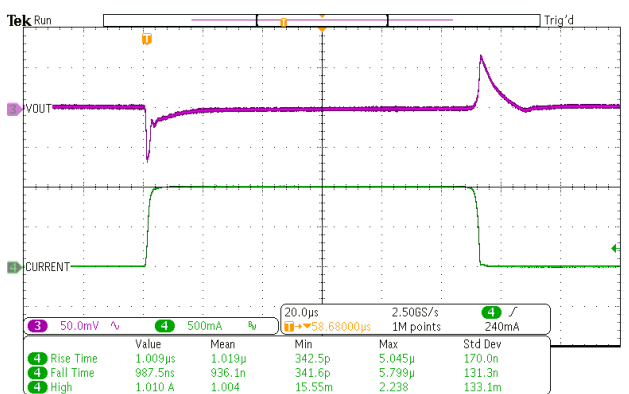**SUNTEK MICRO LTD**

SUL6001D8-25

1mA -> 250mA

1mA -> 500mA

1mA -> 1000mA

0mA -> 300mA

0mA -> 1000mA

SUNTEK MICRO LTD

SUL6001D8-33

1mA -> 250mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.003µs	Low signal amplitude			
Fall Time	918.6ns	Low signal amplitude			
High	270.0mA	236.4m	16.02m	1.032	82.15m

1mA -> 500mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.037µs	Low signal amplitude			
Fall Time	973.2ns	Low signal amplitude			
High	490.0mA	390.8m	16.25m	1.032	172.6m

1mA -> 1000mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.009µs	1.048µ	979.1n	1.177µ	67.26n
Fall Time	993.5ns	1.121µ	936.5n	1.373µ	128.3n
High	1.030 A	1.029	1.010	1.032	5.441m

0mA -> 300mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.030µs	Low signal amplitude			
Fall Time	984.4ns	Low signal amplitude			
High	339.3mA	303.7m	16.17m	1.130	97.71m

0mA -> 1000mA

	Value	Mean	Min	Max	Std Dev
Rise Time	1.164µs	6.197µ	6.723n	118.8µ	10.83µ
Fall Time	969.9ns	5.241µ	15.54n	1.445m	7.039µ
High	1.034 A	372.4m	16.41m	1.130	480.5m

SUNTEK MICRO LTD

SUL6001D8-43

1mA -> 250mA

Tek Run   Trig'd

VOUT

CURRENT

		20.0µs	2.50GS/s	4
3 50.0mV	4 500mA	58.68000µs	1M points	240mA

	Value	Mean	Min	Max	Std Dev
4 Rise Time	952.2ns	Low signal amplitude			
4 Fall Time	898.3ns	Low signal amplitude			
4 High	270.0mA	141.2m	14.77m	1.078	122.7m

1mA -> 500mA

Tek Run   Trig'd

VOUT

CURRENT

		20.0µs	2.50GS/s	4
3 50.0mV	4 500mA	58.68000µs	1M points	240mA

	Value	Mean	Min	Max	Std Dev
4 Rise Time	1.024µs	526.2n	368.7p	9.186µ	453.5n
4 Fall Time	1.047µs	543.1n	351.1p	43.55µ	447.7n
4 High	579.3mA	255.0m	14.77m	1.078	276.5m

1mA -> 1000mA

Tek Run   Trig'd

VOUT

CURRENT

		20.0µs	2.50GS/s	4
3 50.0mV	4 500mA	58.68000µs	1M points	240mA

	Value	Mean	Min	Max	Std Dev
4 Rise Time	1.082µs	1.148µ	368.7p	9.186µ	213.4n
4 Fall Time	1.033µs	1.003µ	365.4p	43.55µ	159.2n
4 High	1.018 A	981.0m	14.77m	1.078	190.3m

0mA -> 300mA

Tek Run   Trig'd

VOUT

CURRENT

		400µs	250MS/s	4
3 50.0mV	4 500mA	798.2800µs	1M points	240mA

	Value	Mean	Min	Max	Std Dev
4 Rise Time	978.1ns	Low signal amplitude			
4 Fall Time	955.3ns	Low signal amplitude			
4 High	310.0mA	250.2m	16.17m	1.130	142.1m

0mA -> 1000mA

Tek Run   Trig'd

VOUT

CURRENT

		400µs	250MS/s	4
3 50.0mV	4 500mA	798.2800µs	1M points	240mA

	Value	Mean	Min	Max	Std Dev
4 Rise Time	1.130µs	4.909µ	6.723n	118.8µ	9.700µ
4 Fall Time	933.8ns	4.318µ	15.54n	1.445m	11.24µ
4 High	1.050 A	514.6m	16.17m	1.130	511.4m

     SUNTEK MICRO LTD

Turn-on waveform by V_{IN} & CE @ light load

(V_{IN} = CE = 0 V to V_{OUT}+1V, C_{IN} = C_{OUT} = 1.0 μF, Ta = 25°C, I_{OUT} = 1 mA)

SUL6001D8-090

	Value	Mean	Min	Max	Std Dev
1 Rise Time	1.286μs	1.307μ	1.183μ	1.411μ	44.97n

SUL6001D8-12

	Value	Mean	Min	Max	Std Dev
1 Rise Time	1.372μs	1.392μ	1.321μ	1.483μ	43.75n

SUL6001D8-18

	Value	Mean	Min	Max	Std Dev
1 Rise Time	1.473μs	1.453μ	1.430n	50.43μ	417.3n

SUL6001D8-25

	Value	Mean	Min	Max	Std Dev
1 Rise Time	1.313μs	1.339μ	1.281μ	1.397μ	29.18n

SUL6001D8-33

	Value	Mean	Min	Max	Std Dev
1 Rise Time	1.379μs	1.463μ	5.107n	33.22μ	1.179μ

SUL6001D8-43

	Value	Mean	Min	Max	Std Dev
1 Rise Time	1.360μs	1.398μ	1.360μ	1.432μ	19.66n

SUNTEK MICRO LTD

Turn-on waveform by V_{IN} & CE @ full load

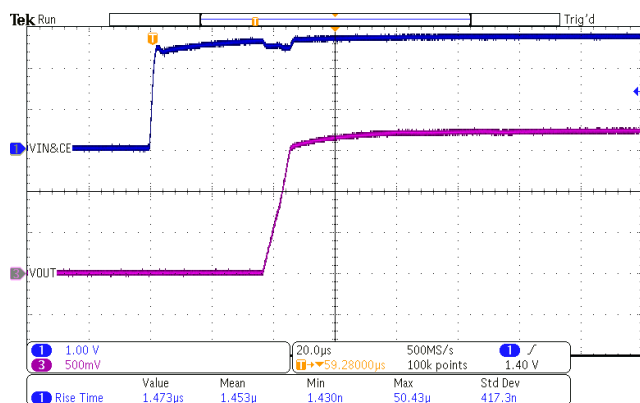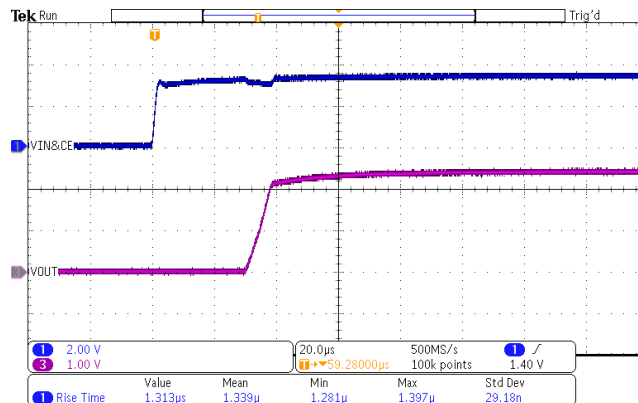(V_{IN} = CE = 0 V to V_{OUT}+1V, C_{IN} = C_{OUT} = 1.0μF, Ta = 25°C, I_{OUT}=1A)
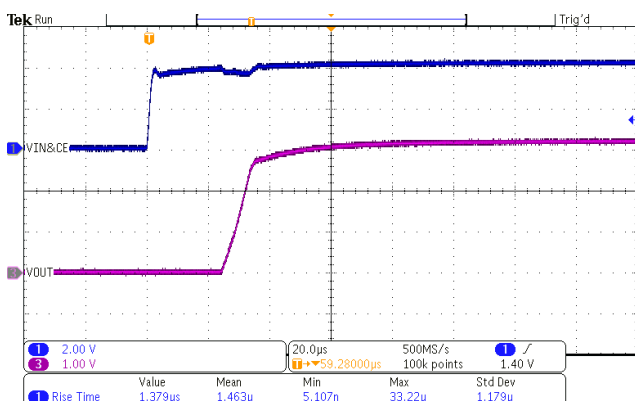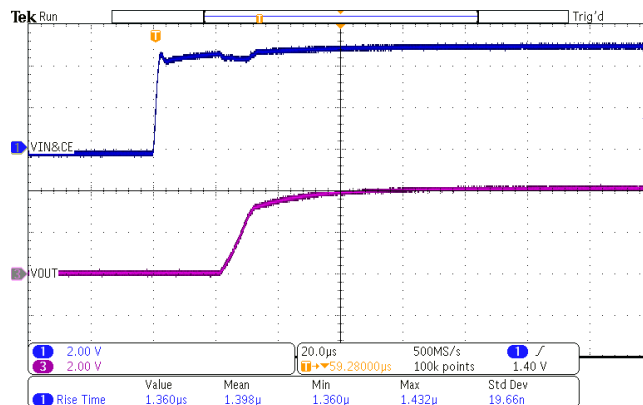
SUL6001D8-090
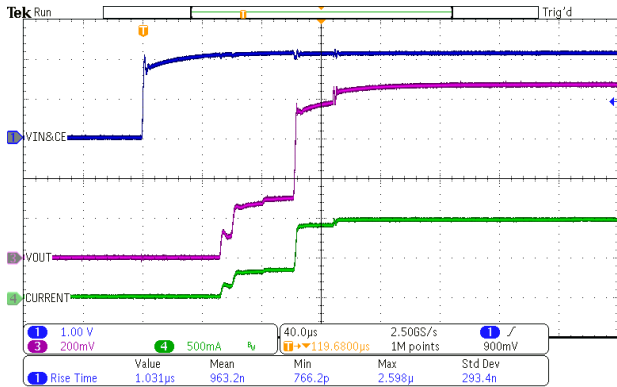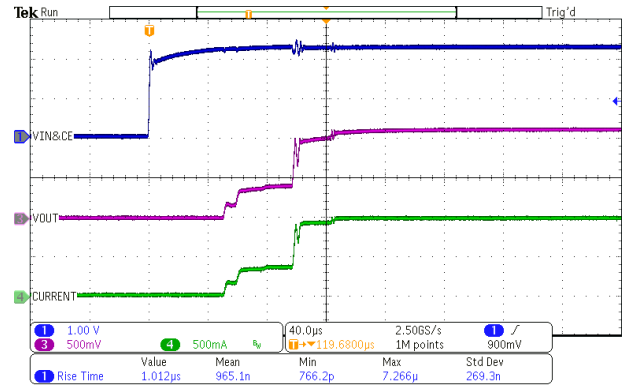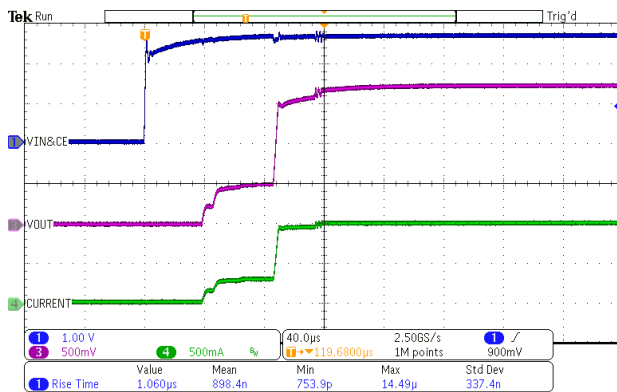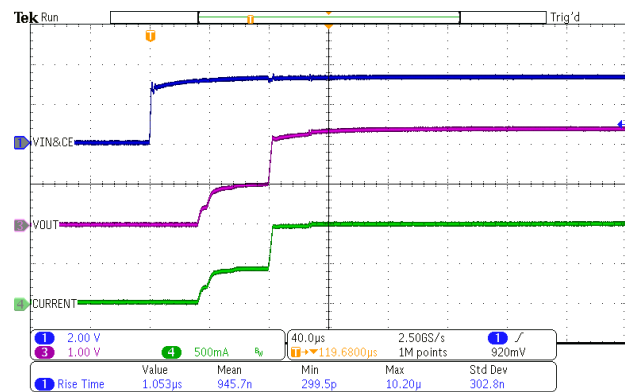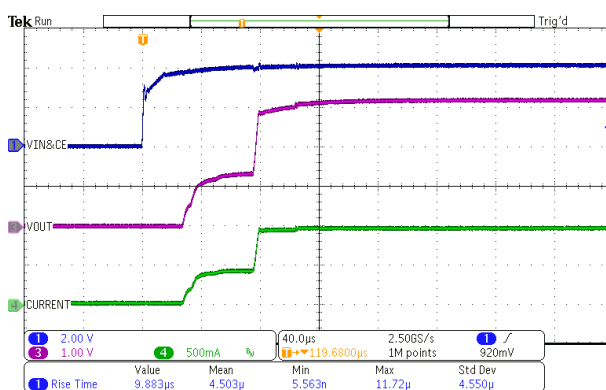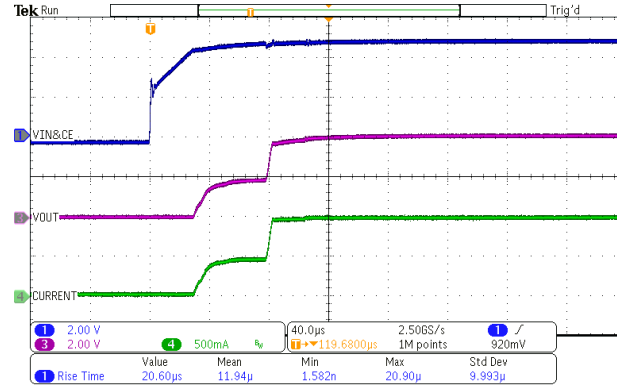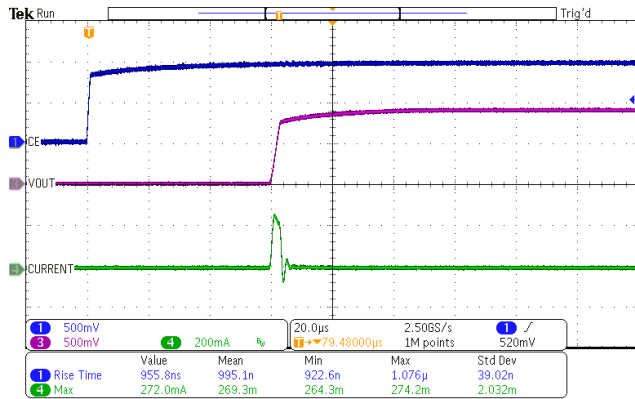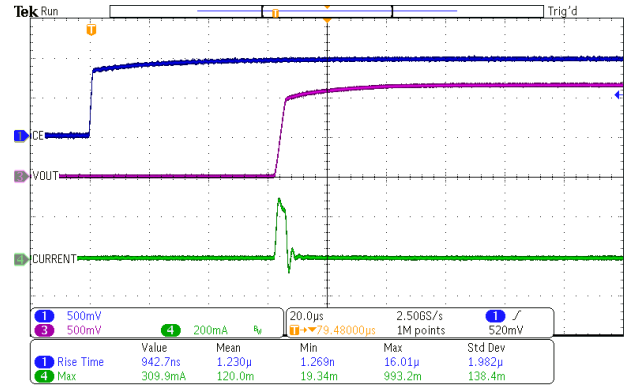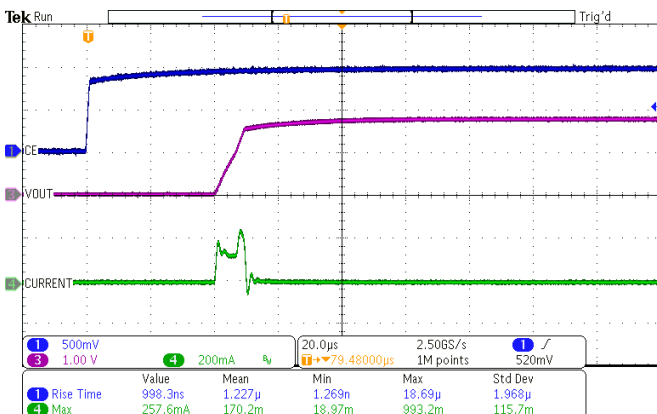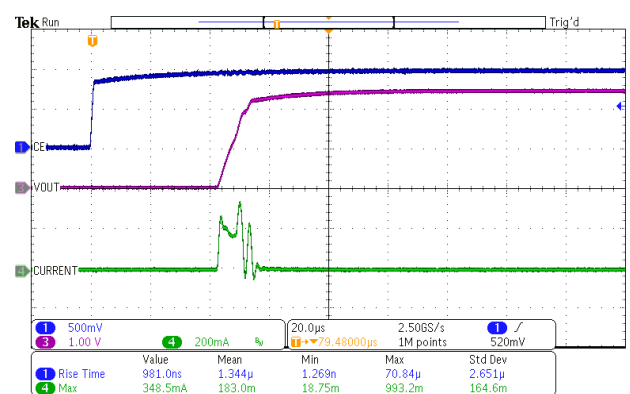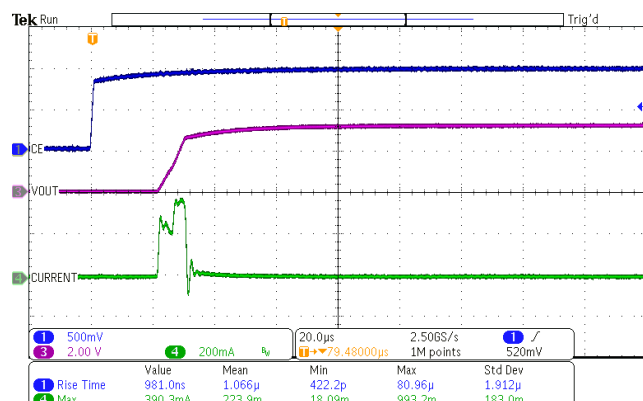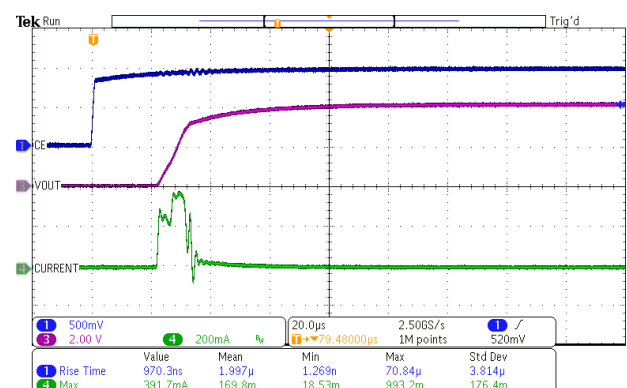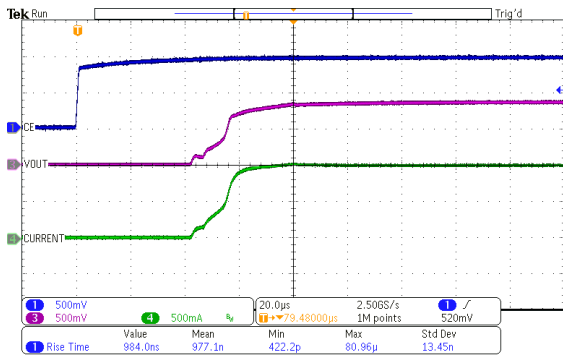
SUL6001D8-12

SUL6001D8-18

SUL6001D8-25

SUL6001D8-33

SUL6001D8-43

Turn-on by CE pin & Inrush current @ no load

(V_{IN} = V_{OUT}+1V, CE = 0V to 1V, C_{IN} = C_{OUT} = 1.0μF, Ta = 25°C, I_{OUT}=0mA)

SUL6001D8-09

		500mV		20.0μs	2.50GS/s	
		500mV	4	200mA	79.48000μs	1M points	520mV
		Value	Mean	Min	Max	Std Dev
1	Rise Time	955.8ns	995.1n	922.6n	1.076μ	39.02n
4	Max	272.0mA	269.3m	264.3m	274.2m	2.032m

SUL6001D8-12

		500mV		20.0μs	2.50GS/s	
		500mV	4	200mA	79.48000μs	1M points	520mV
		Value	Mean	Min	Max	Std Dev
1	Rise Time	942.7ns	1.230μ	1.269n	16.01μ	1.982μ
4	Max	309.9mA	120.0m	19.34m	993.2m	138.4m

SUL6001D8-18

		500mV		20.0μs	2.50GS/s	
		1.00 V	4	200mA	79.48000μs	1M points	520mV
		Value	Mean	Min	Max	Std Dev
1	Rise Time	998.3ns	1.227μ	1.269n	18.69μ	1.968μ
4	Max	257.6mA	170.2m	18.97m	993.2m	115.7m

SUL6001D8-25

		500mV		20.0μs	2.50GS/s	
		1.00 V	4	200mA	79.48000μs	1M points	520mV
		Value	Mean	Min	Max	Std Dev
1	Rise Time	981.0ns	1.344μ	1.269n	70.84μ	2.651μ
4	Max	348.5mA	183.0m	18.75m	993.2m	164.6m

SUL6001D8-33

		500mV		20.0μs	2.50GS/s	
		2.00 V	4	200mA	79.48000μs	1M points	520mV
		Value	Mean	Min	Max	Std Dev
1	Rise Time	981.0ns	1.066μ	422.2p	80.96μ	1.912μ
4	Max	390.3mA	223.9m	18.09m	993.2m	183.0m

SUL6001D8-43

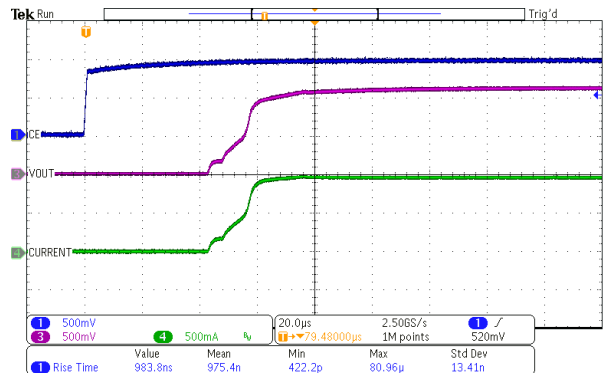|		500mV		20.0μs	2.50GS/s	
		2.00 V	4	200mA	79.48000μs	1M points	520mV
		Value	Mean	Min	Max	Std Dev
1	Rise Time	970.3ns	1.997μ	1.269n	70.84μ	3.814μ
4	Max	391.7mA	169.8m	18.53m	993.2m	176.4m

Turn-on by CE pin @ full load

(V_{IN} = V_{OUT}+1V , CE = 0V to 1V, C_{IN} = C_{OUT} = 1.0µF, Ta = 25°C, I_{OUT}=1A)

SUL6001D8-090

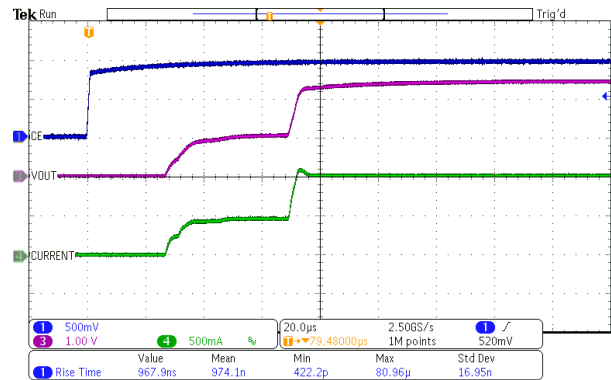### SUL6001D8-12

SUL6001D8-18

SUL6001D8-25

SUL6001D8-33

SUL6001D8-43

SUNTEK MICRO LTD
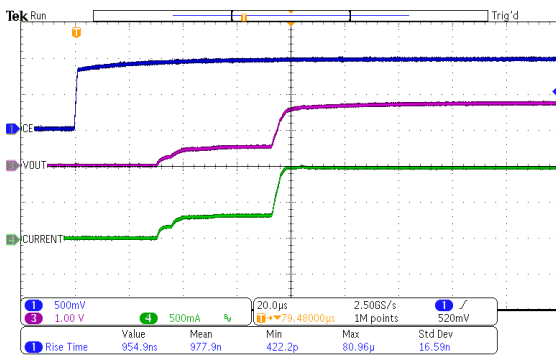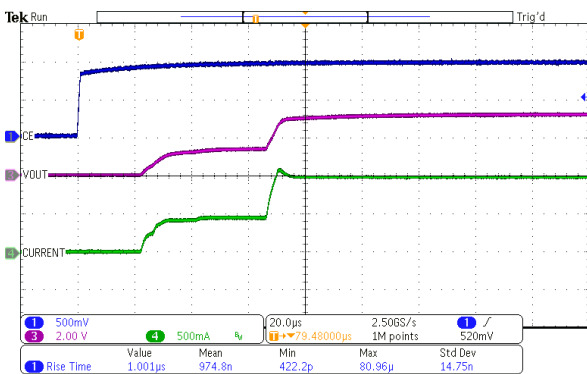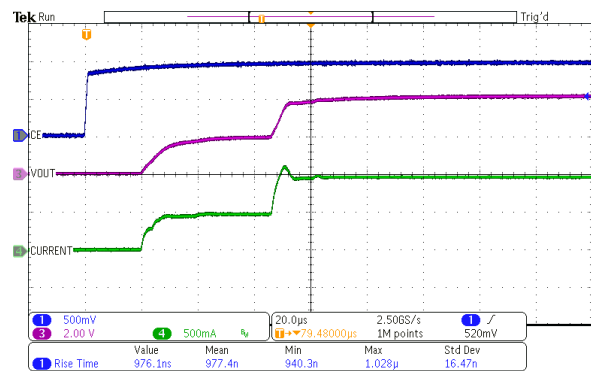
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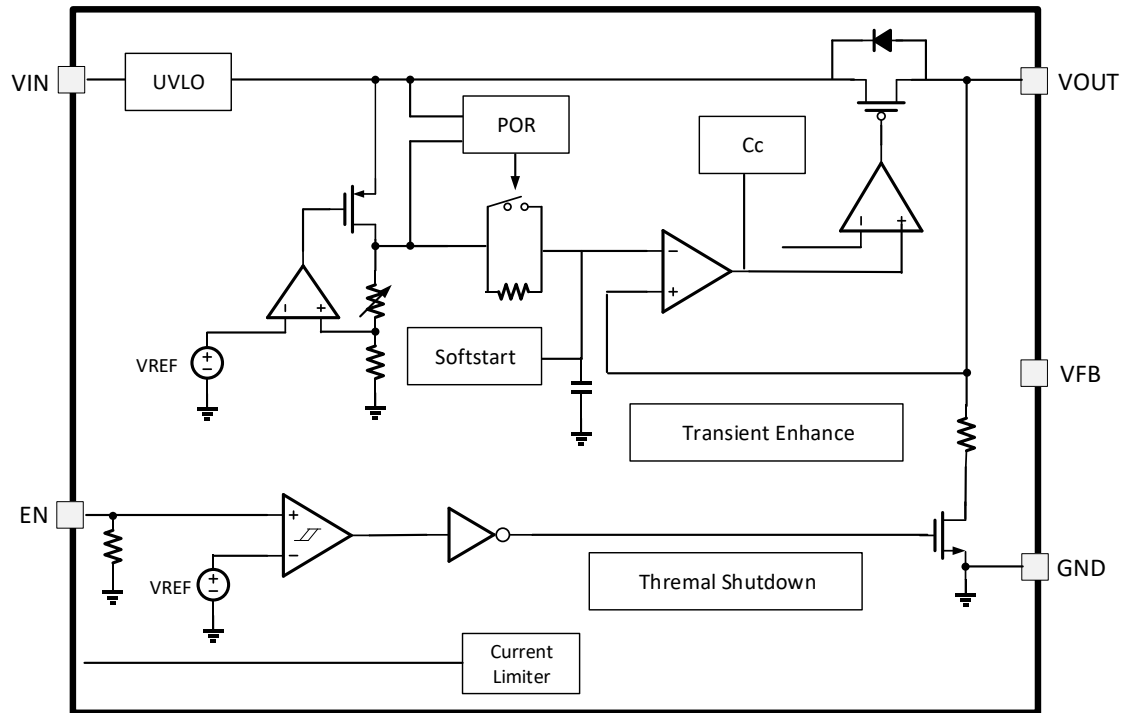
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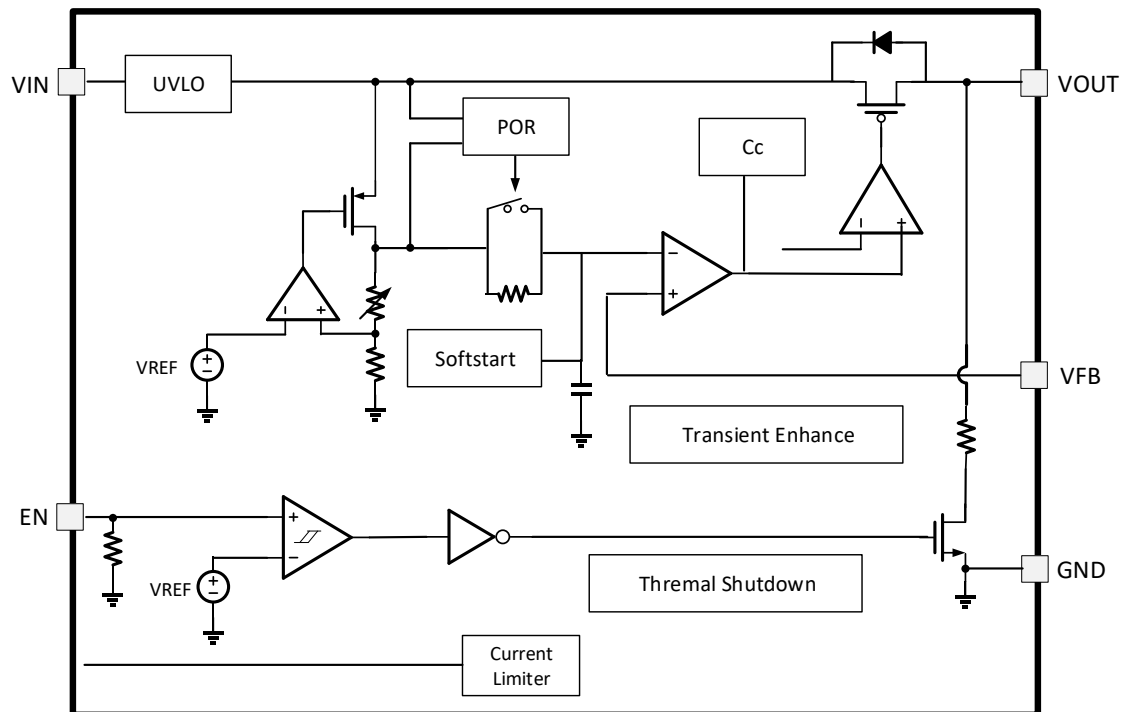
SOT23-5 ADJ Mode

DFN1216-8 ADJ Mode

SUNTEK MICRO LTD
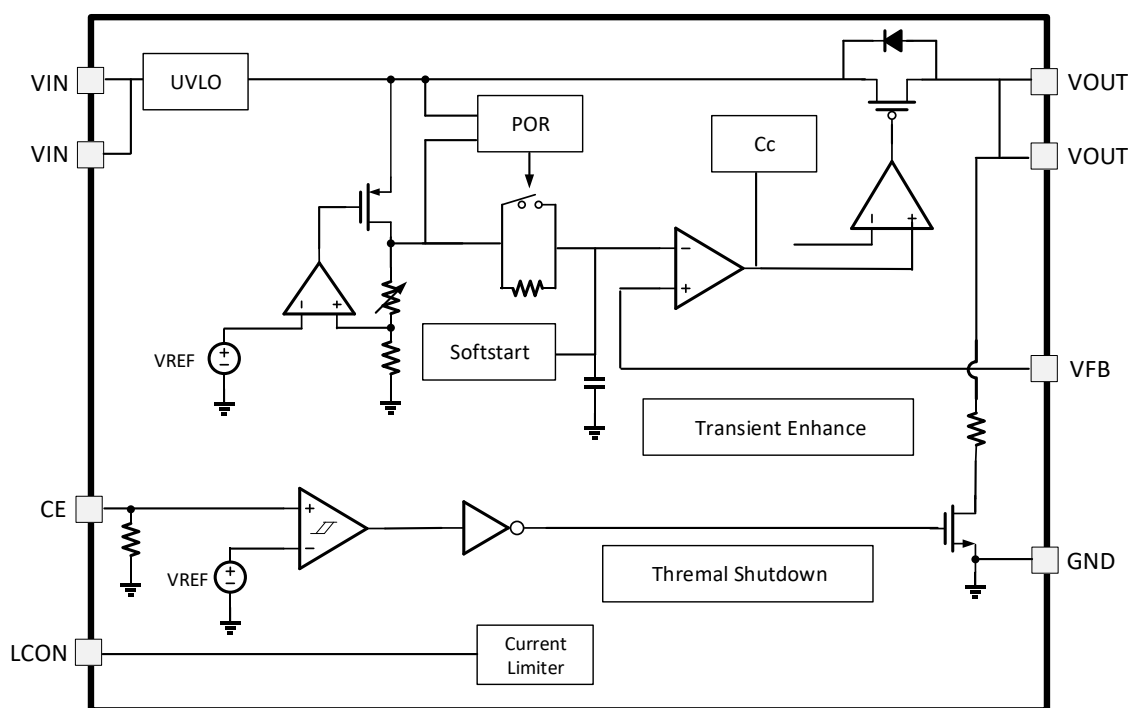
FUNCTION DESCRIPTION

Short-Circuit Protect and Current Limitation

SUL6001 series LDOs can protect internal circuit under short-circuit condition on the output. When the load current increases above 1.55A, the current limit and current foldback mechanism starts to restrict the I_{LIM} value. If the load resistance decreases even more then the foldback, circuit starts limiting the current to 0.2A when V_{OUT} = 0.

Over Temperature Protection and Auto Recover

In order to prevent over thermal condition from damaging the device, SUL6001 series LDOs have internal thermal limiting functions designed to protect the device. It will rapidly shut off PMOS pass element during over temperature condition.

Current Foldback

The current limiting/ current foldback circuit plays an important role by controlling any excessive output current. Our SUL6001 series LDOs provide a current foldback circuit that can detect accurately when an over-current condition occurs.

Very Fast Transient Response

In addition to the main feedback loop, SUL6001 series LDOs contain a fast-transient loop that allows the LDO to respond faster to large-output transients. SUL6001 series LDOs that contain this loop are better able to minimize the effects of a load transient even the output capacitance is small. The recommended output capacitance value is 1µF. It's small size greatly reduce the cost and save PCB area.

Ultra High PSRR and Extreme Low Noise

SUNTEK's SUL6001 series high-performance LDO regulators feature remarkable power supply rejection ratio characteristics (up to 104dB at 10kHz) and extreme-low noise operation (as low as 6.3µVRMS with A-wt) resulting in cleaner and stable output voltages. Our LDO is very suitable for ultra-sensitive loads like camera module and security monitor, especially in low light condition.

Start-Up at Full Load

SUL6001 series LDOs can start-up at full load, make it very suitable for heavy load start up condition and severe system timing constraint.

Auto Discharge Function

SUL6001 series LDOs have an auto discharge function to quickly force the output voltage to zero. When the LDO is disabled, the auto discharge function quickly discharge the output capacitor, thereby reducing the output voltage to nearly zero. This function is very useful for quickly ON/OFF application.

Low Quiescent Current

SUL6001 series LDOs consume only 85µA (typical) while operating with no load condition. By reducing the quiescent current, your application can stay in standby/sleep mode much longer than leading low quiescent current LDOs in the market.

Under Voltage Lock OUT (UVLO)

SUL6001 has an undervoltage lockout (UVLO) function to make sure that whole circuit does nothing until the power supply voltage is high enough. When power supply voltage is high enough, reference circuit can generate right voltage ; logic function can generate correct control signals. This UVLO function can guarantee robust system performance.
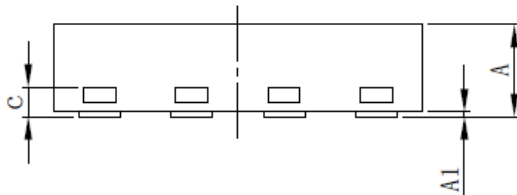
PACKAGE DIMENSION: DFN1216-8

TOP VIEW

BOTTOM VIEW

EXPOSED THERMAL PAD ZONE
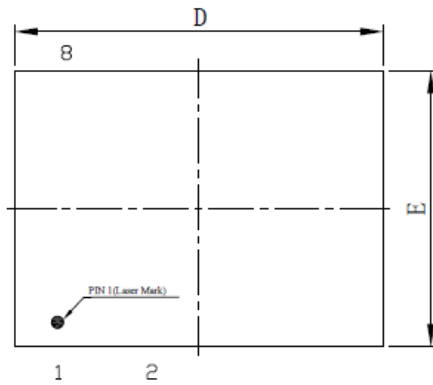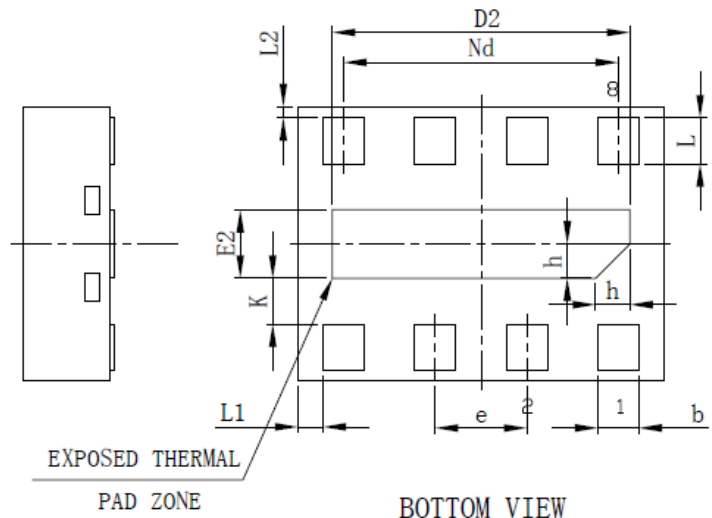
SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.35	-	0.40
A1	0	0.02	0.05
b	0.13	0.18	0.23
c	0.127REF		
D	1.55	1.60	1.65
D2	1.25	1.30	1.35
e	0.40BSC		
Nd	1.20BSC		
E	1.15	1.20	1.25
E2	0.25	0.30	0.35
L	0.15	0.20	0.25
L1	0.06	0.11	0.16
L2	0.05REF		
h	0.10	0.15	0.20
K	0.15	0.20	0.25

PACKAGE DIMENSION:SOT-23-5
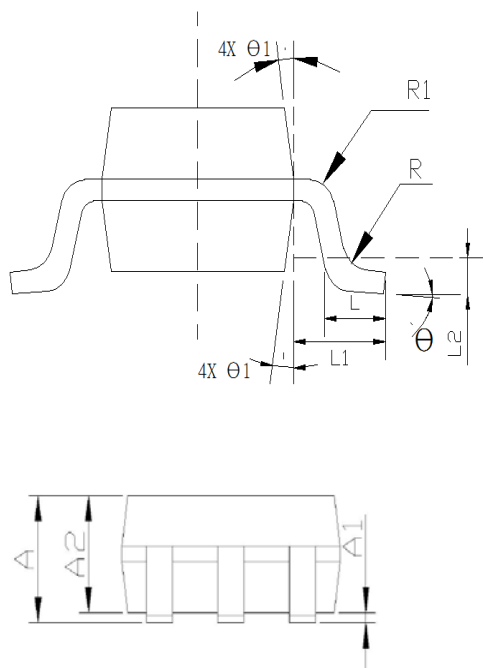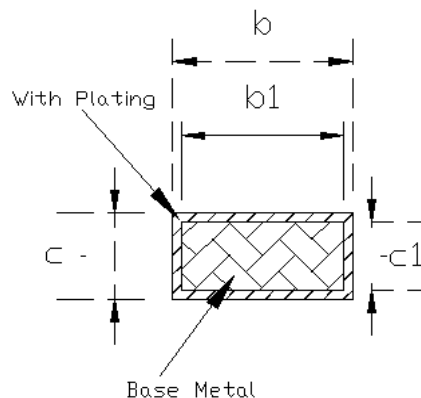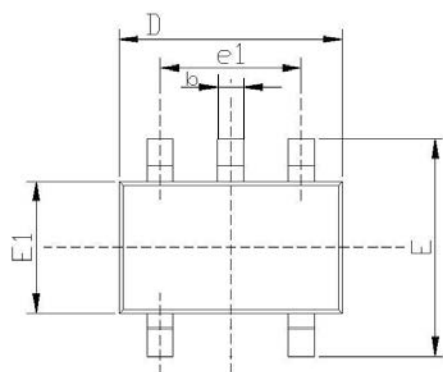
Common Dimensions (Units of Measure=Millimeter)			
SYMBOL	MINIMUM	NOMINAL	MAXIMUM
A	–	–	1.35
A1	0	–	0.15
A2	1.00	1.10	1.20
b	0.35	–	0.45
b1	0.32	–	0.38
c	0.14	–	0.20
c1	0.14	0.15	0.16
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.6 REF		
L2	0.25 REF		
R	0.10	–	–
R1	0.10	–	0.25
Θ	0º	4º	8º
$\Theta 1$	5º	10º	15º

NOTES:

1. All dimensions refer to standard.
2. Dimensions D does not include mold FLASH.
3. Dimensions E1 does not include mold FLASH.
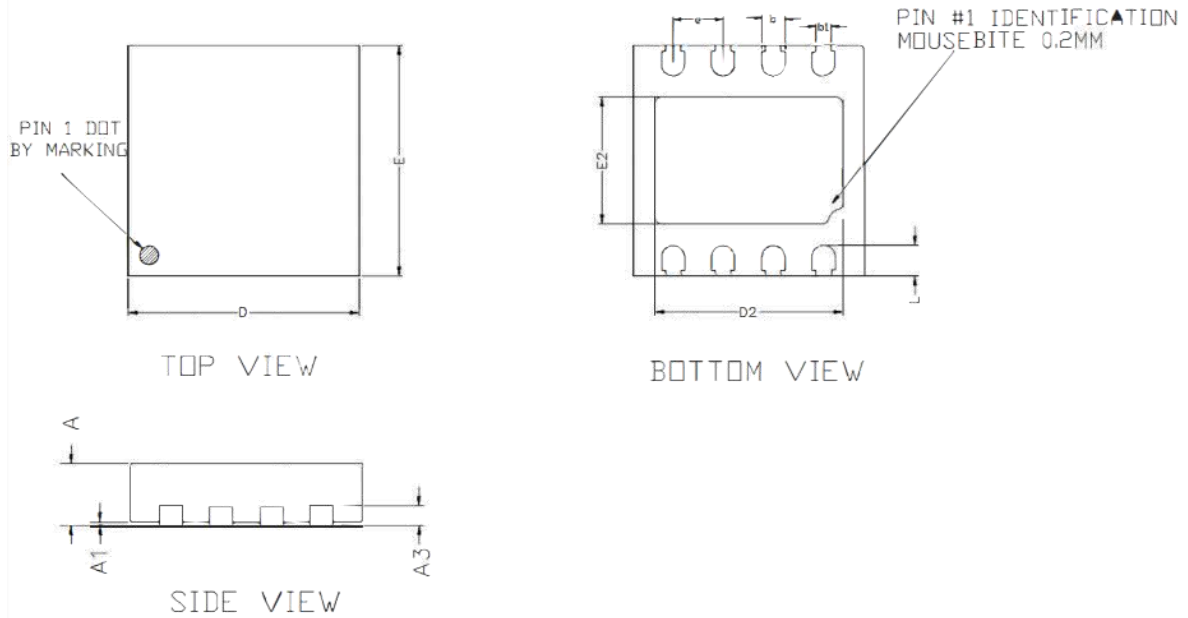4. FLASH or protrusion shall not exceed 0.25mm per side. .

PACKAGE DIMENSION: DFN2x2-6

TOP VIEW

EXPOSED THERMAL PAD ZONE

BOTTOM VIEW
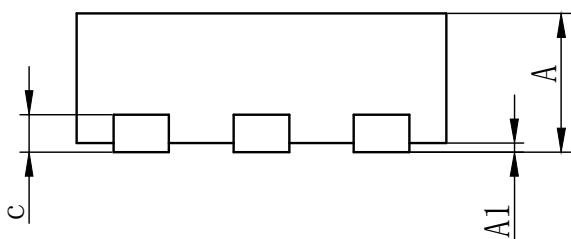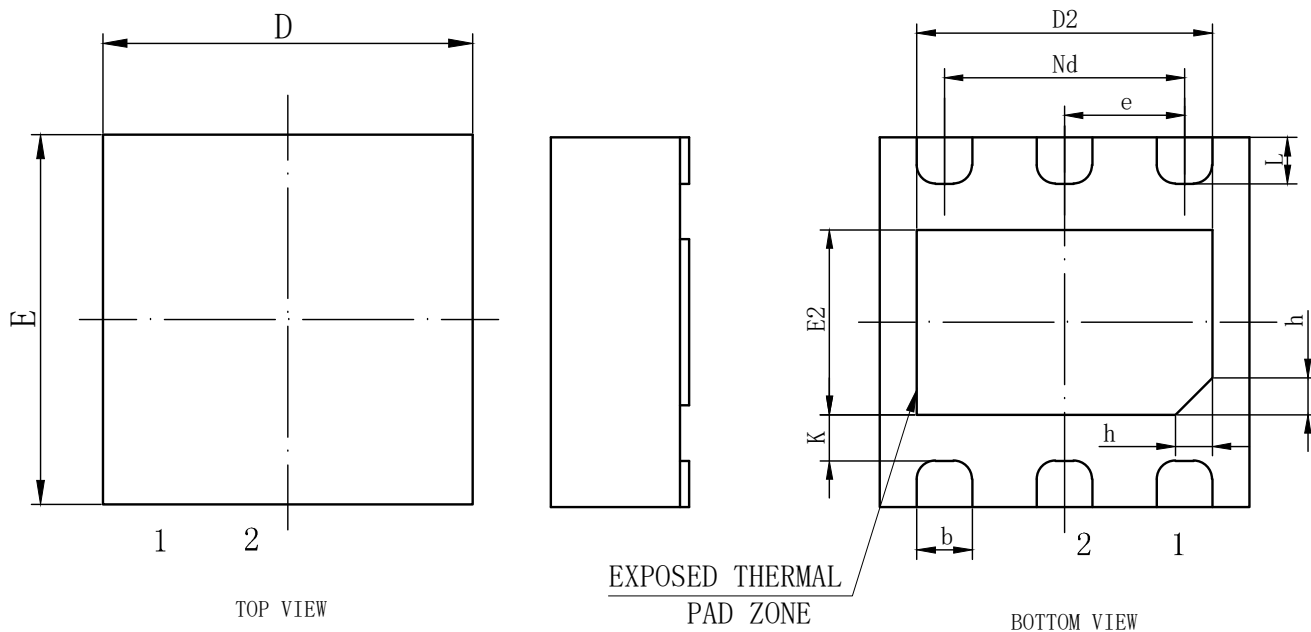
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
	0.85	0.90	0.95
A1	0	0.02	0.05
b	0.25	0.30	0.35
c	0.18	0.20	0.25
D	1.90	2.00	2.10
D2	1.50	1.60	1.70
e	0.65BSC		
Nd	1.30BSC		
E	1.90	2.00	2.10
E2	0.90	1.00	1.10
K	0.20	–	–
L	0.20	0.25	0.30
h	0.15	0.20	0.25
L/F载体尺寸（MIL）	69X47/71X47		

PACKAGE DIMENSION:DFN3x3-8

TOP VIEW

BOTTOM VIEW

PIN #1 IDENTIFICATION
MOUSEBITE 0.2MM

PIN 1 DOT
BY MARKING

SIDE VIEW

COMMON DIMENSIONS(MM)			
PKG.	W:VERY VERY THIN		
REF.	MIN.	NOM.	MAX
A	0.70	0.75	0.80
A1	0.00	–	0.05
A3	0.2 REF.		
D	2.95	3.00	3.05
E	2.95	3.00	3.05
b	0.25	0.30	0.35
L	0.30	0.40	0.50
D2	2.40	2.45	2.50
E2	1.60	1.65	1.70
e	0.65 BSC		
b1	0.20		